TN
859
.C64
C3755
no. 3
v. 7

U. S. DEPARTMENT OF THE INTERIOR

PROTOTYPE OIL SHALE LEASING PROGRAM

TRACT C-b

QUARTERLY REPORT #3

(Through May 31, 1975)

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Submitted to:

Mr. Peter A. Rutledge
Area Oil Shale Supervisor
Conservation District
U. S. Geological Survey
Grand Junction, Colorado

By:

Ashland Oil, Inc.
Atlantic Richfield Company
Shell Oil Company, Operator
The Oil Shale Corporation

JULY 15, 1975

SHOUT
SHARE
IT

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Schlumberger

CEMENT BOND LOG

GR-VDL-CCL

COUNTY RIO BLANCO
Field or LOCATION
WELL SG-NO.6
COMPANY ATLANTIC RICHFIELD COMPANY

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SG NO.6

FIELD

COUNTY RIO BLANCO STATE COLORADO

LOCATION API Serial No.
2523' FSL & 2251; FWL

Sec. 7 Twp. 3S Rge. 96W

Other Services:

Permanent Datum: GROUND LEVEL, Elev. 6888
Log Measured From GL, 0 Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B. ----
D.F. ----
G.L. 6888

Date	9-13-74	Type Drill Fluid	WATER
Run No.	ONE	Fluid Level	FULL
Depth — Driller	2220-1474	Max. Rec. Temp.	---- °F
Depth — Logger	1458-1475	Est. Cement Top	1132
Btm. Log Interval	1432-1467	Equip. | Location	3862 | VERNAL
Top Log Interval	982- 892	Recorded By	ST. AUBYN
Open Hole Size	7 7/8	Witnessed By	MR. ROSS

CASING REC.	Size	Wt/Ft	Grade	Type Joint	Top	Bottom
Surface String	8 5/8			T & C	SURF	59
Prot. String	2 3/8	4.7		T & C	SURF	2210
Prod. String	2 3/8	4.7		T & C	SURF	1466
Liner	2 3/8	4.7		T & C	SURF	1194

PRIMARY CEMENTING DATA

STRING	Surface	Protection	Production	Liner
Vol. of cement			210 SKS	
Type of cement			HOWCO LT. WT.	
Additive			10#/SK GILSONITE	
Retarder				
Wt. of slurry				
Water loss				
Type fluid in csg.				
Fluid wt.				

The well name, location and borehole

SWS-729-I

FOLD HERE The well name, location and borehole reference data were furnished by the customer.

PRIMARY CEMENTING PROCEDURE	Hour — date	Hours from start of operation
Started pumping cement	08:30 8-27-74	
Release pressure	09:30 8-27-74	
Start Cement Bond Log	10:00 9-13-74	
Finish Cement Bond Log	16:00 9-13-74	

REMARKS

Service Order No. 49323

Csg. Collars Recorded 19 ft. DEEP

Preceding fluid____ Volume____ bbls.

Cement pumped____ bbls./minute

Pipe reciprocated during Pumping: Yes____ No____

Pipe reciprocated after plug down: Yes____ min., No____

SQUEEZE JOB DETAIL		
Squeeze number	1	2
Date		
Depth interval		
Type cement		
Volume of cement		
Additive		
Retarder		
Weight of slurry		
Preceding fluid		
Breakdown pressure		
Max. pressure-stage 1		
" " " 2		
" " " 3		
Final maximum pressure		
Started pumping cement		
Released pressure		
Start CBL		
Finish CBL		

EQUIPMENT DATA	Centralizer Depths	Scratcher Depths
Sonic Panel No.	SLP-FH#639	
Sonic Cart No.	SHH-AHA#45	
Sonic Sonde No.	SLT-JC#54	
CRP No.	14	
Mem Panel No.	MMP-B#201	
GR Panel No.	GNP-D#556	
GR Cart No.	SHH-AFA#91	
Centralizer: Type	CME-V CAL-AJ	
No.	CMEW	
To Level (MV)	100	
Cart. Gain	1/20	
CRP Intensity	.16	
R9G Intensity	7½	
Logging Speed	30 FPM	
Time Constant		

AVERAGE WELL DRIFT:
° from to ; ° from to ; ° from to

Remarks: UNABLE TO GET TO BOTTOM ON NO.1-LONG STRING [illegible] NO.2-MIDDLE STR
THEN RUN JUST WEIGHT AND COLLAR LOCATOR IN NO.1-LONG STRING DRAG AT

Remarks: UNABLE TO GET TO BOTTOM ON NO.1-LONG STRING. LOGGED NO.2-MIDDLE STRI
THEN RUN JUST WEIGHT AND COLLAR LOCATOR IN NO.1-LONG STRING DRAG AT
BOTTOM OF SHORT STRING AND BOTTOM OF MIDDLE STRING TRIED TO RUN LOGGING
TOOLS BUT WOULD ONLY GO TO 1458. PERFORATED NO.1-LONG STRING FROM 1625-
2161 WITH 1 11/16" HYPERDOME-ONE SHOT PER FOOT

TRANSIT TIME
MICROSECONDS ________ SPACING
400 200

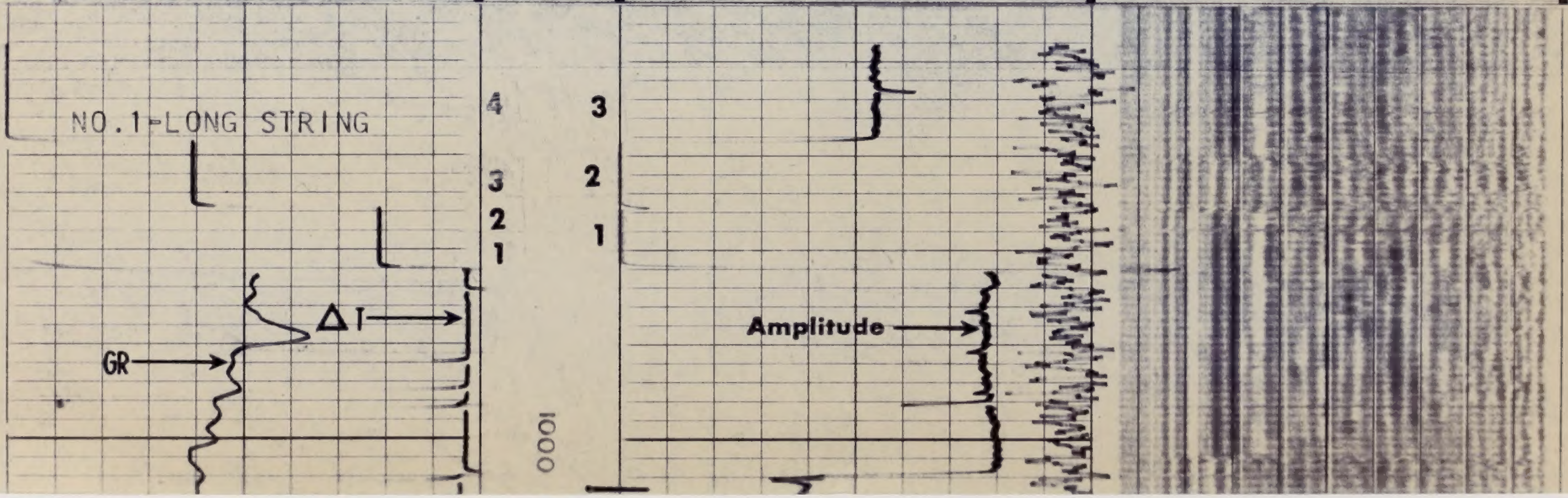
GAMMA RAY API UNITS

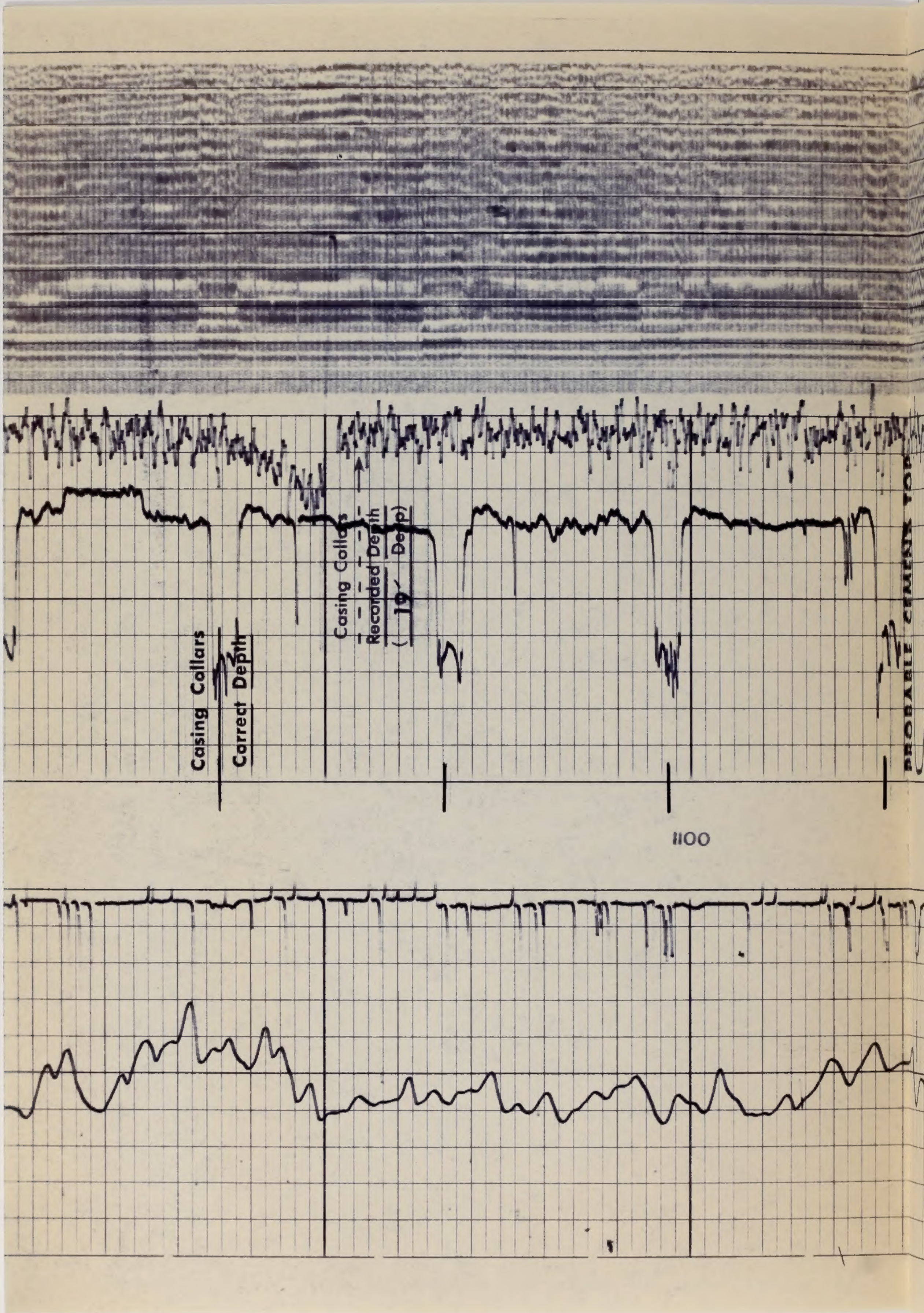
DEPTH

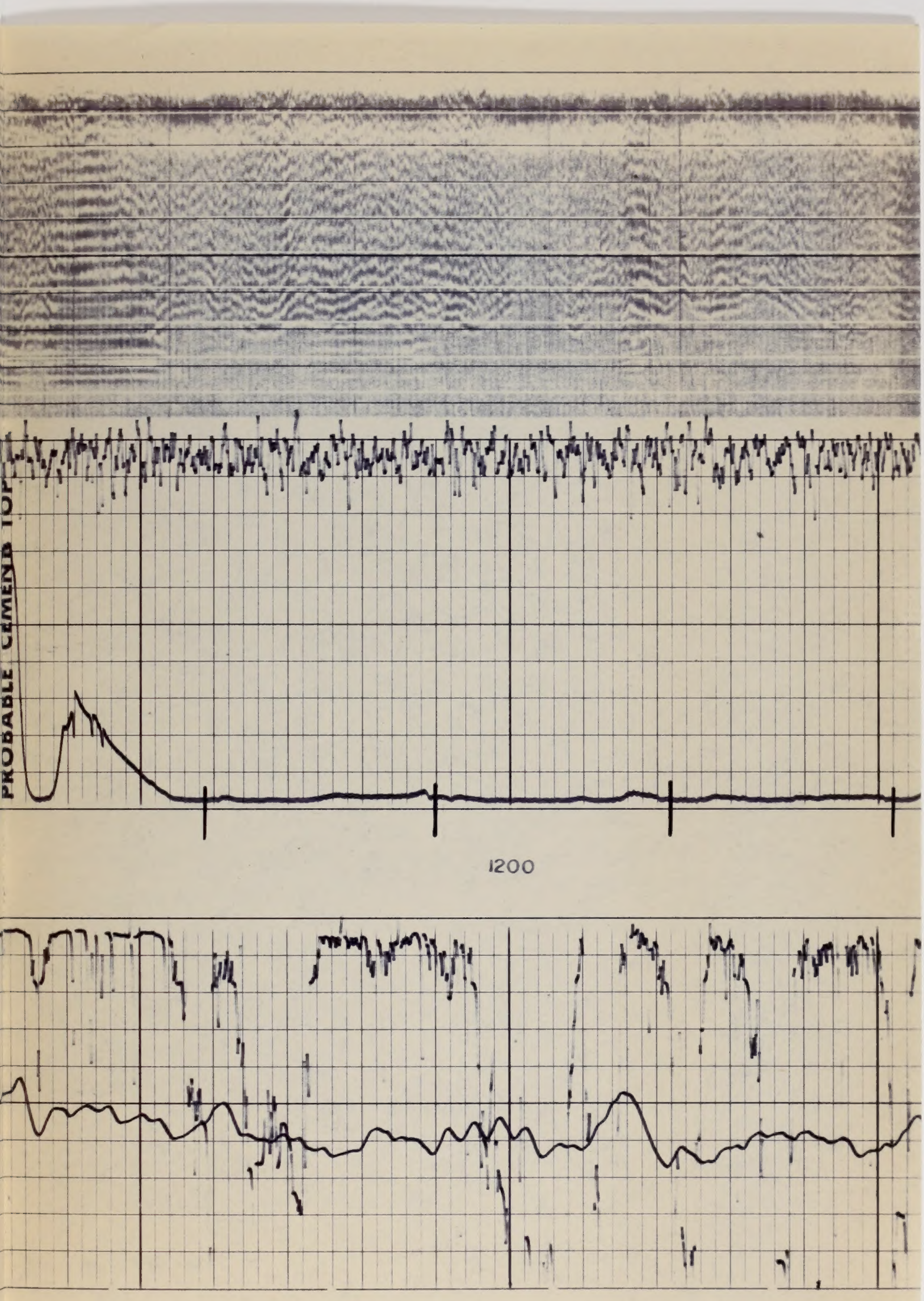
CASING BOND
MILLIVOLTS
0 100

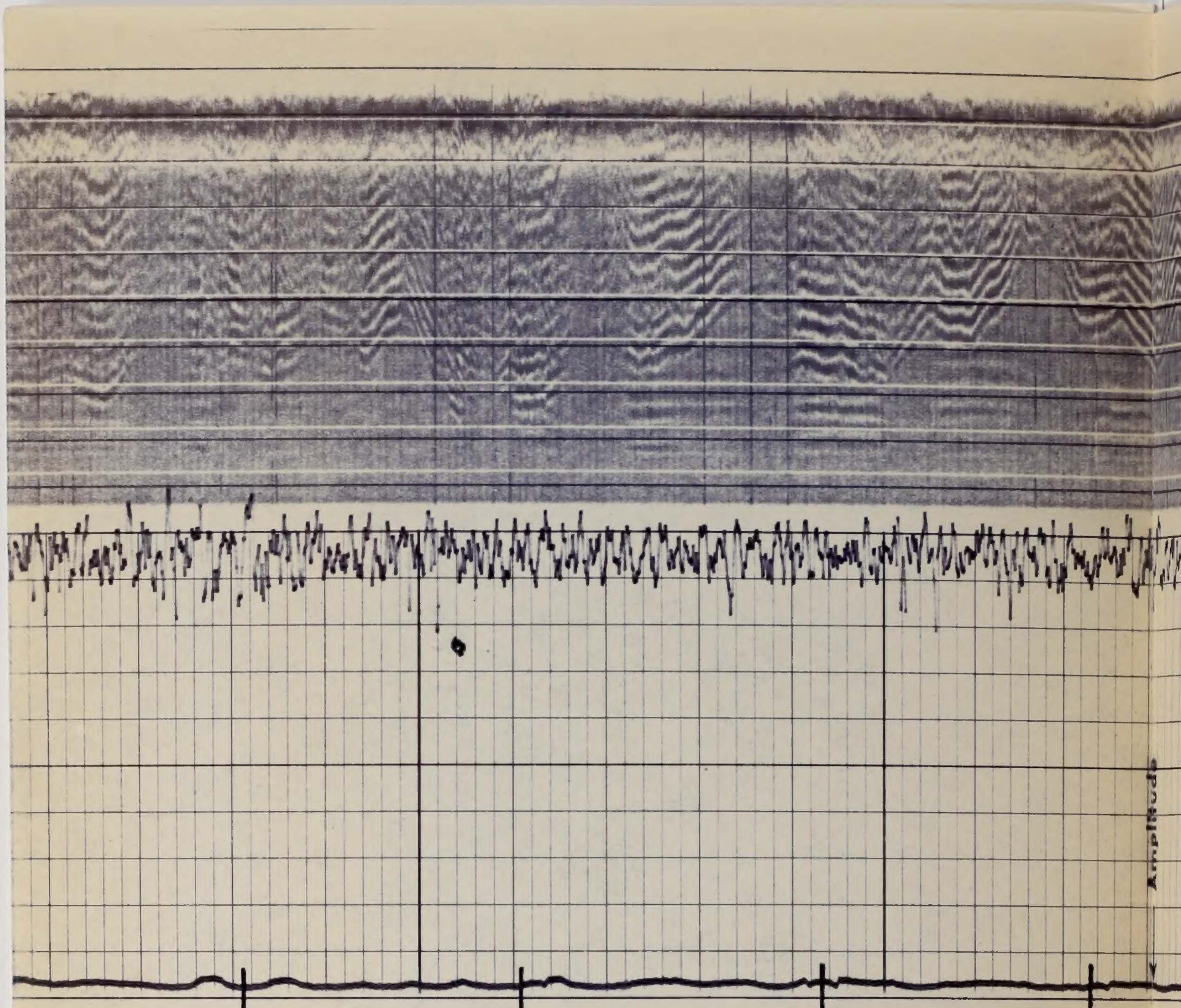
Casing Collars
Corrected Depth

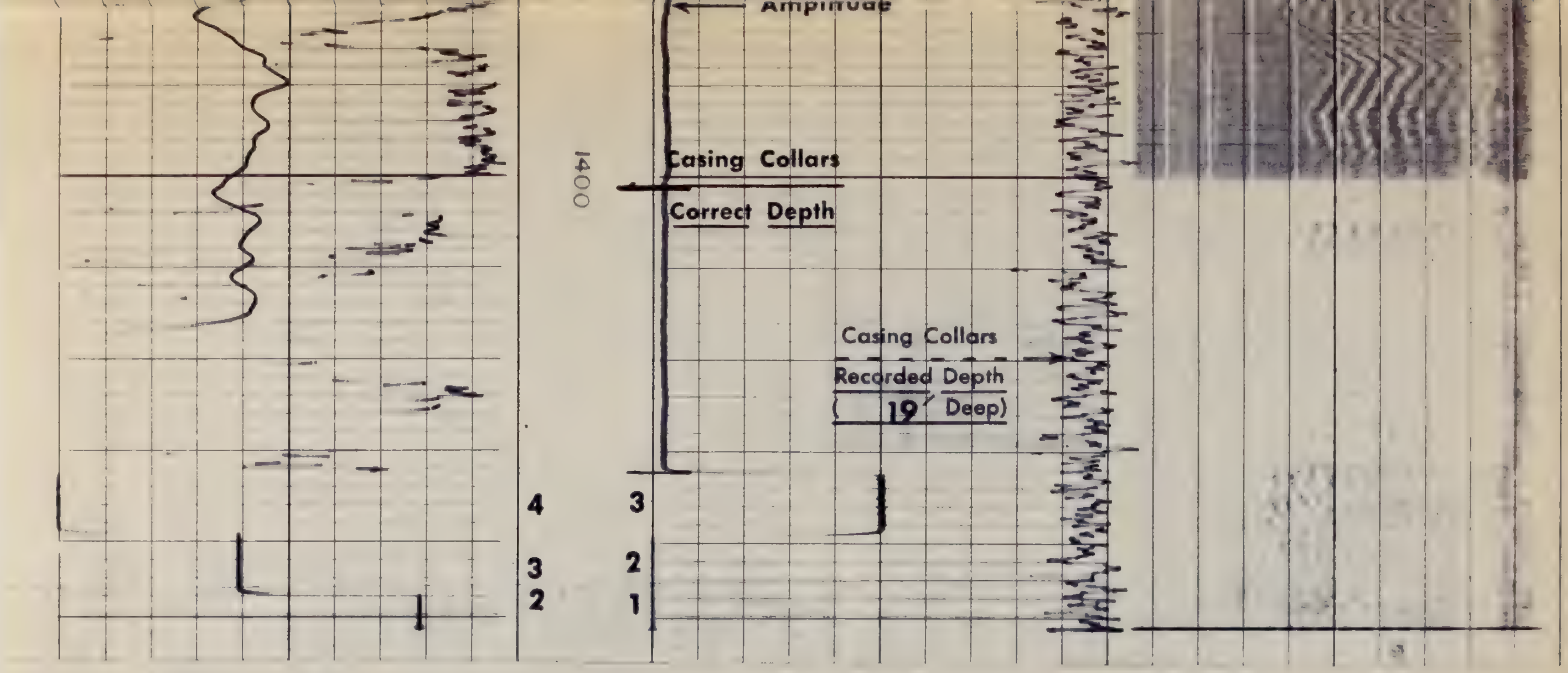
VARIABLE DENSITY
MICROSECONDS 5 FT. SPACING
200 1200

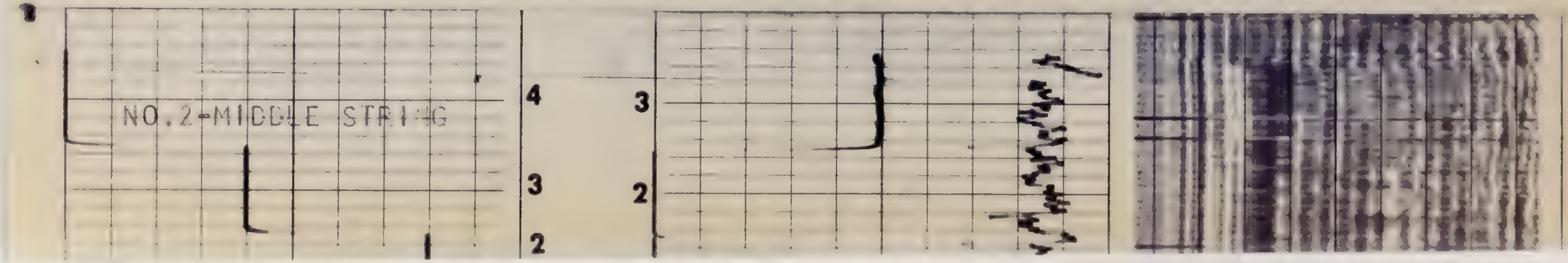


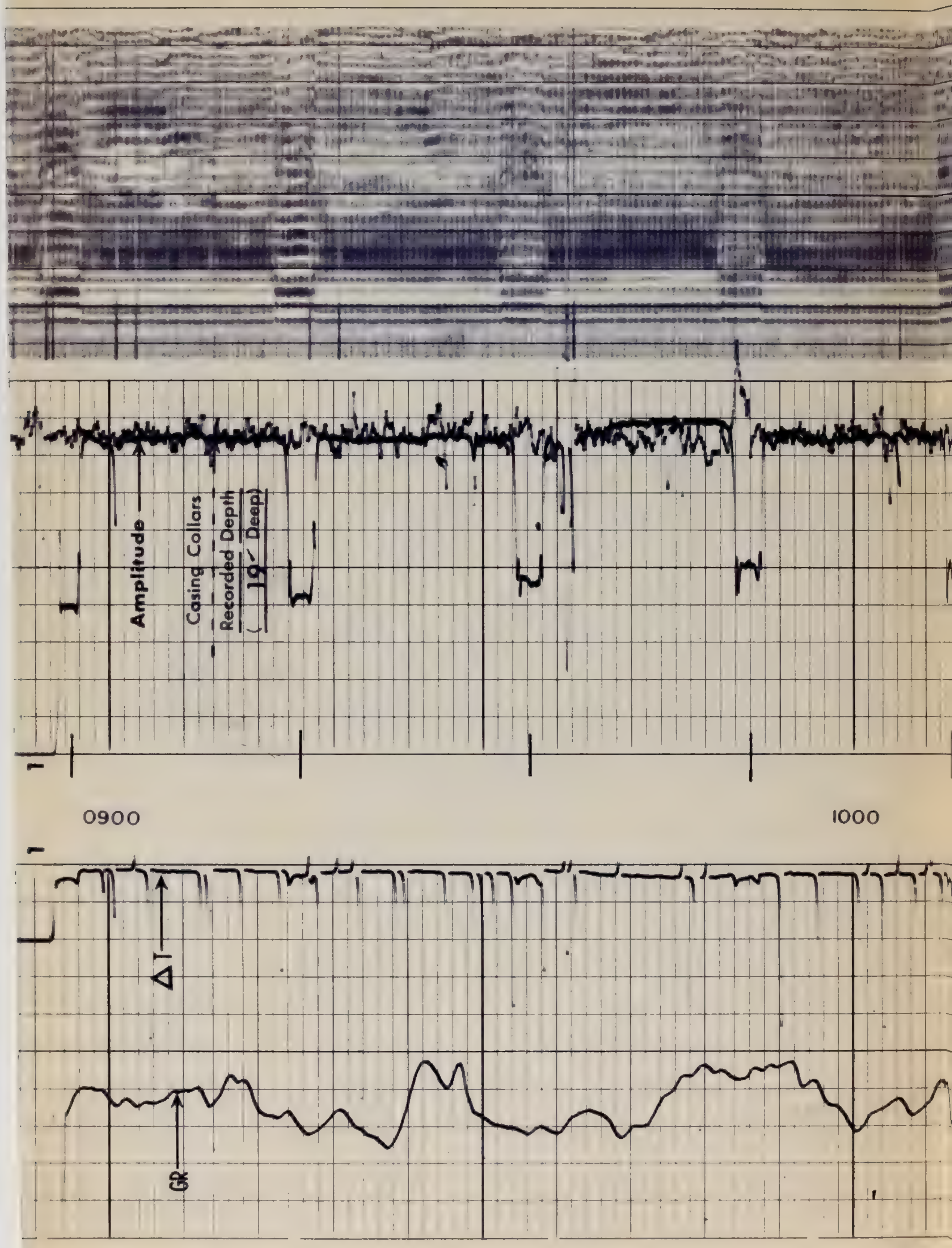

Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(19' Deep)
PROBABLE CEMENT TOP
1100

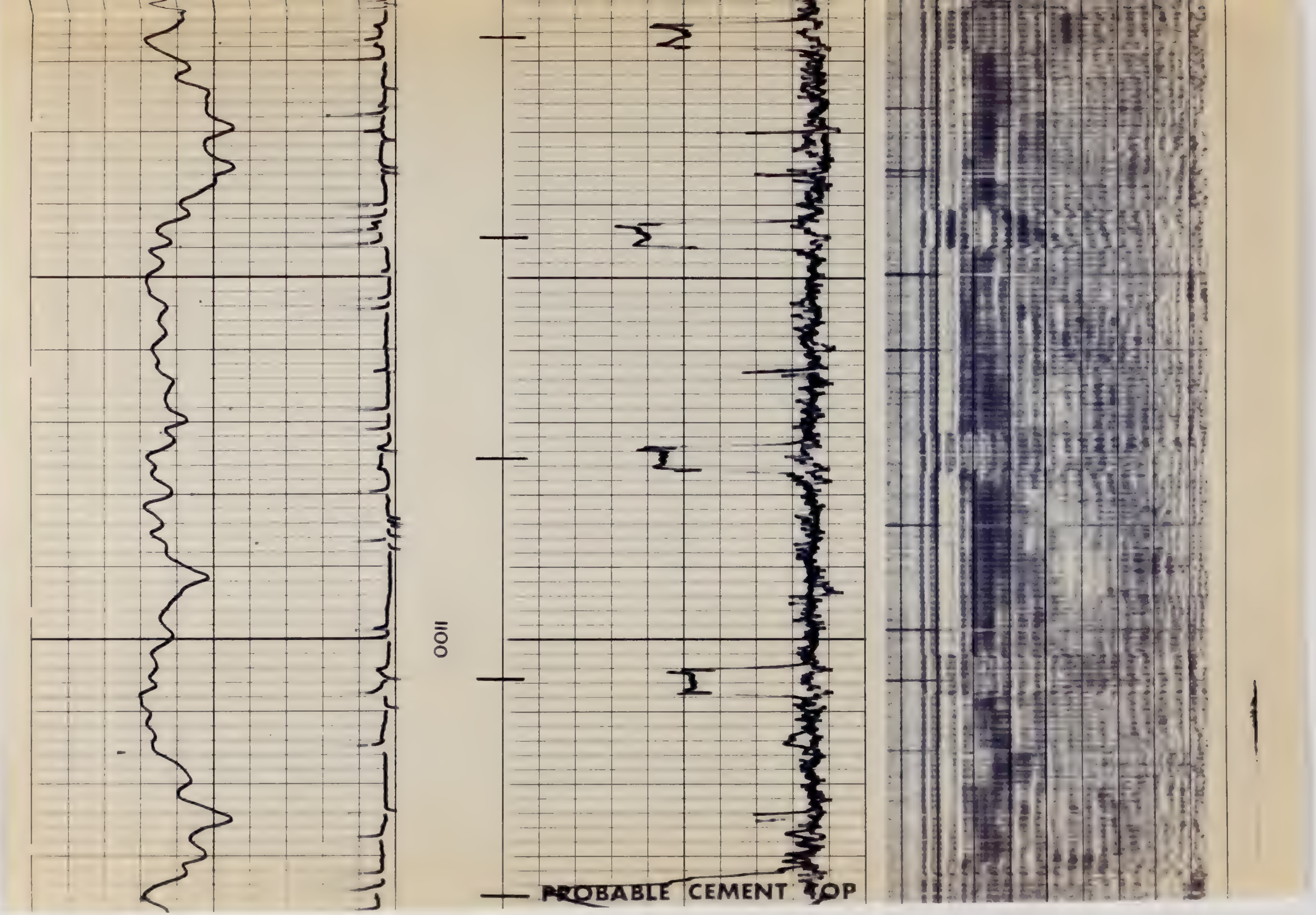

PROBABLE CEMENT TOP
1200

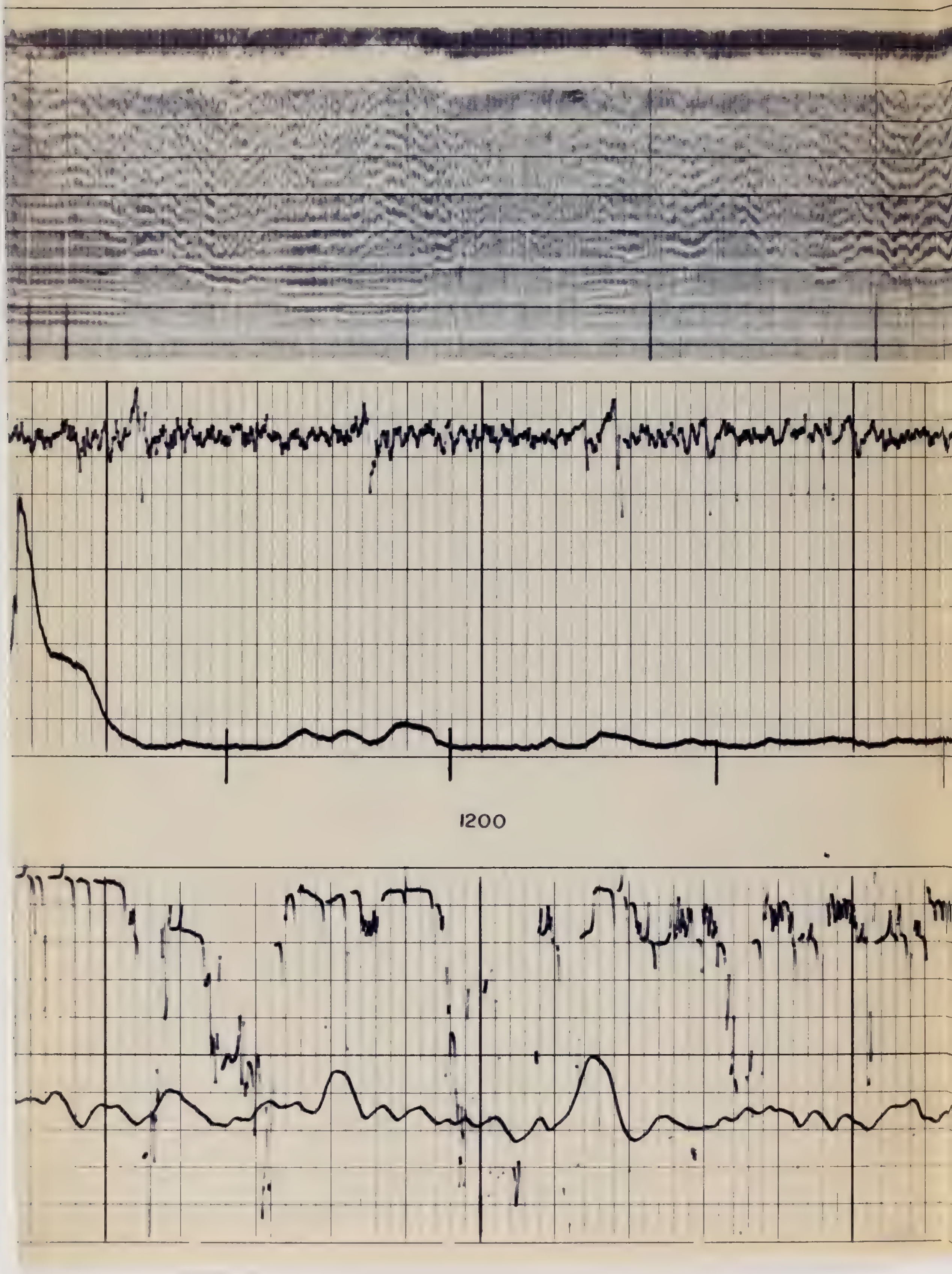

Amplitude
1300
ΔT
GR

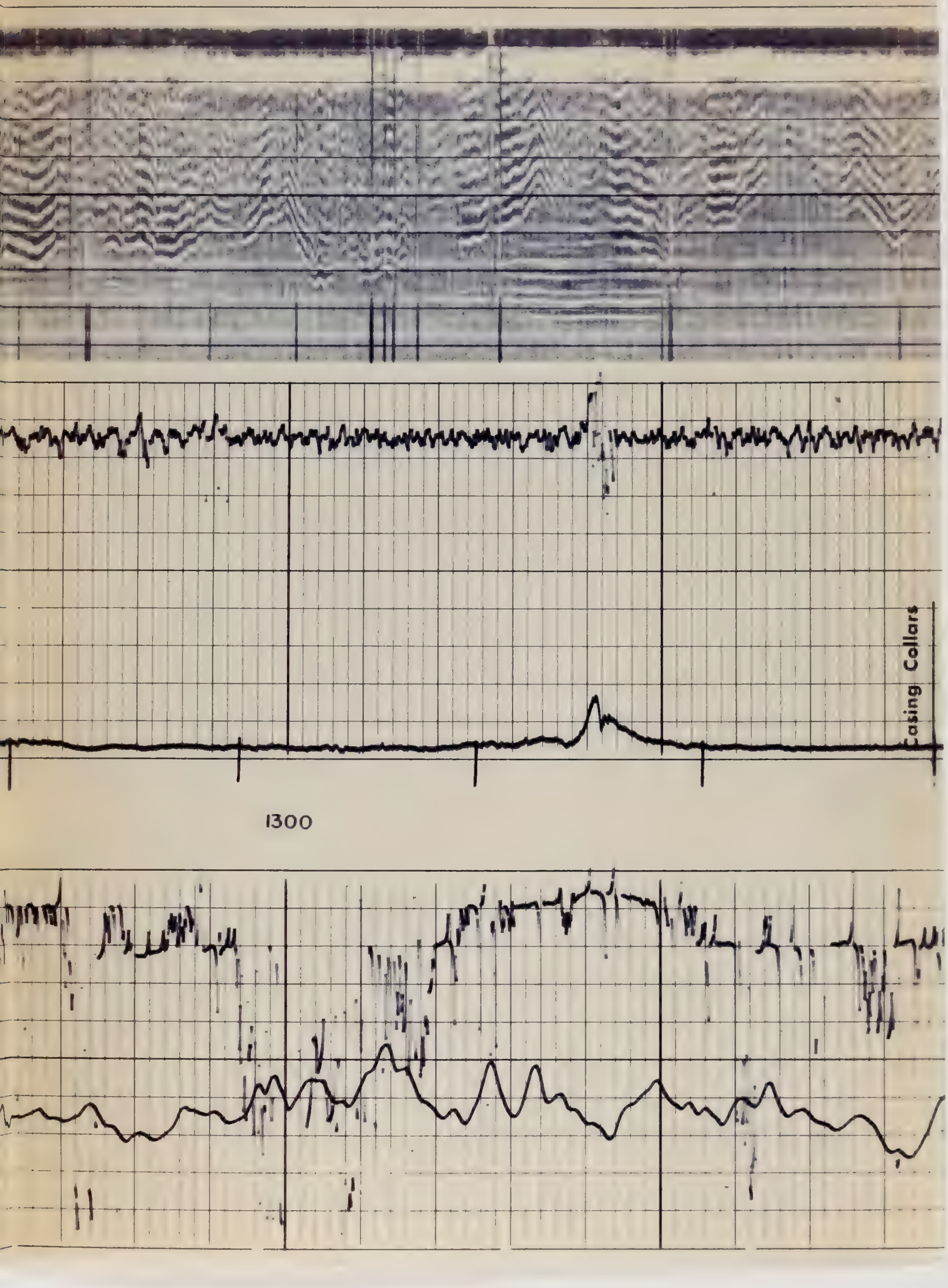

Amplitude
Casing Collars
Correct Depth
1400
Casing Collars
Recorded Depth
(19' Deep)
4
3
2
3
2
1

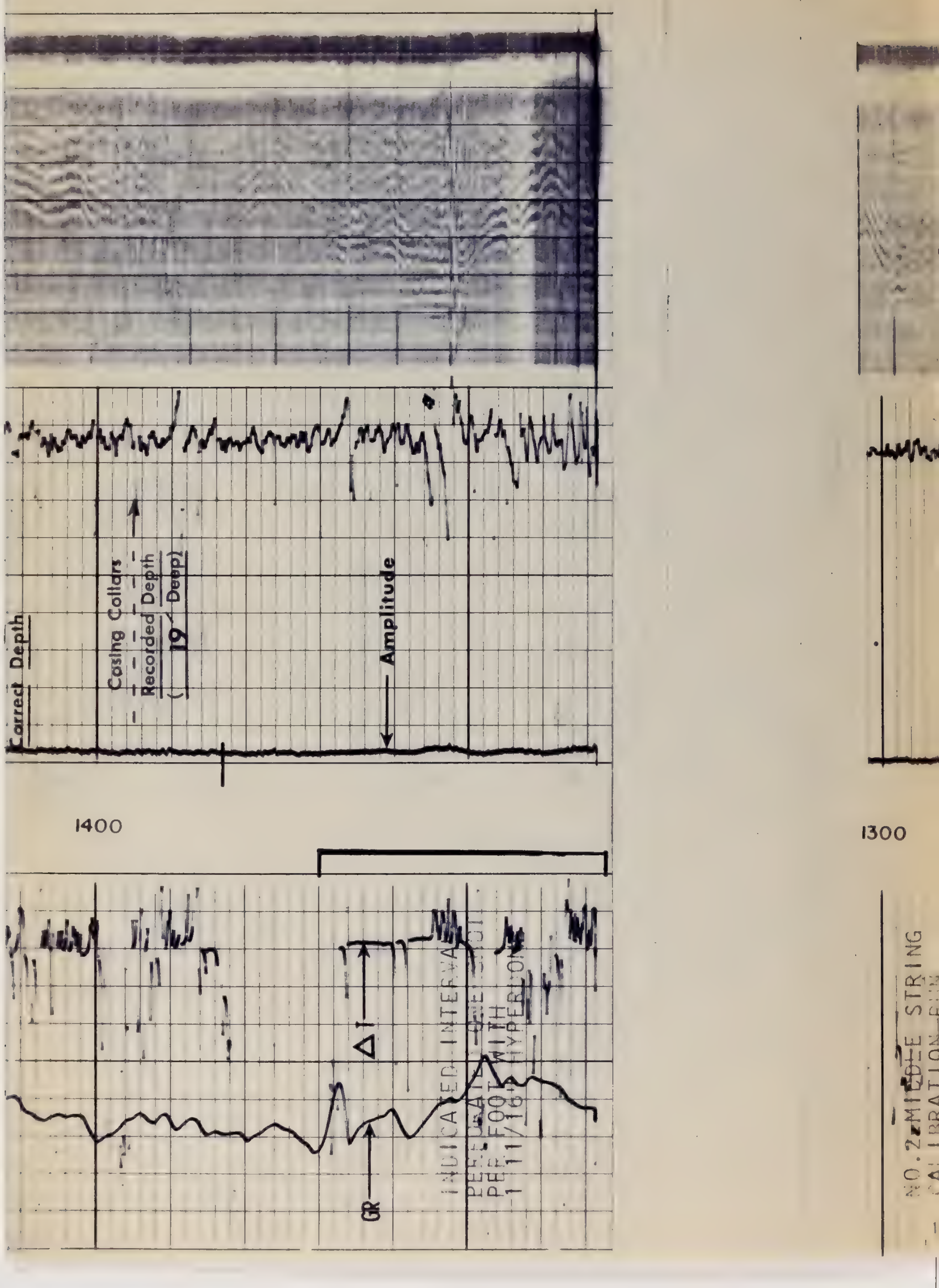

NO.2-MIDDLE STRING
4
3
2
3
2

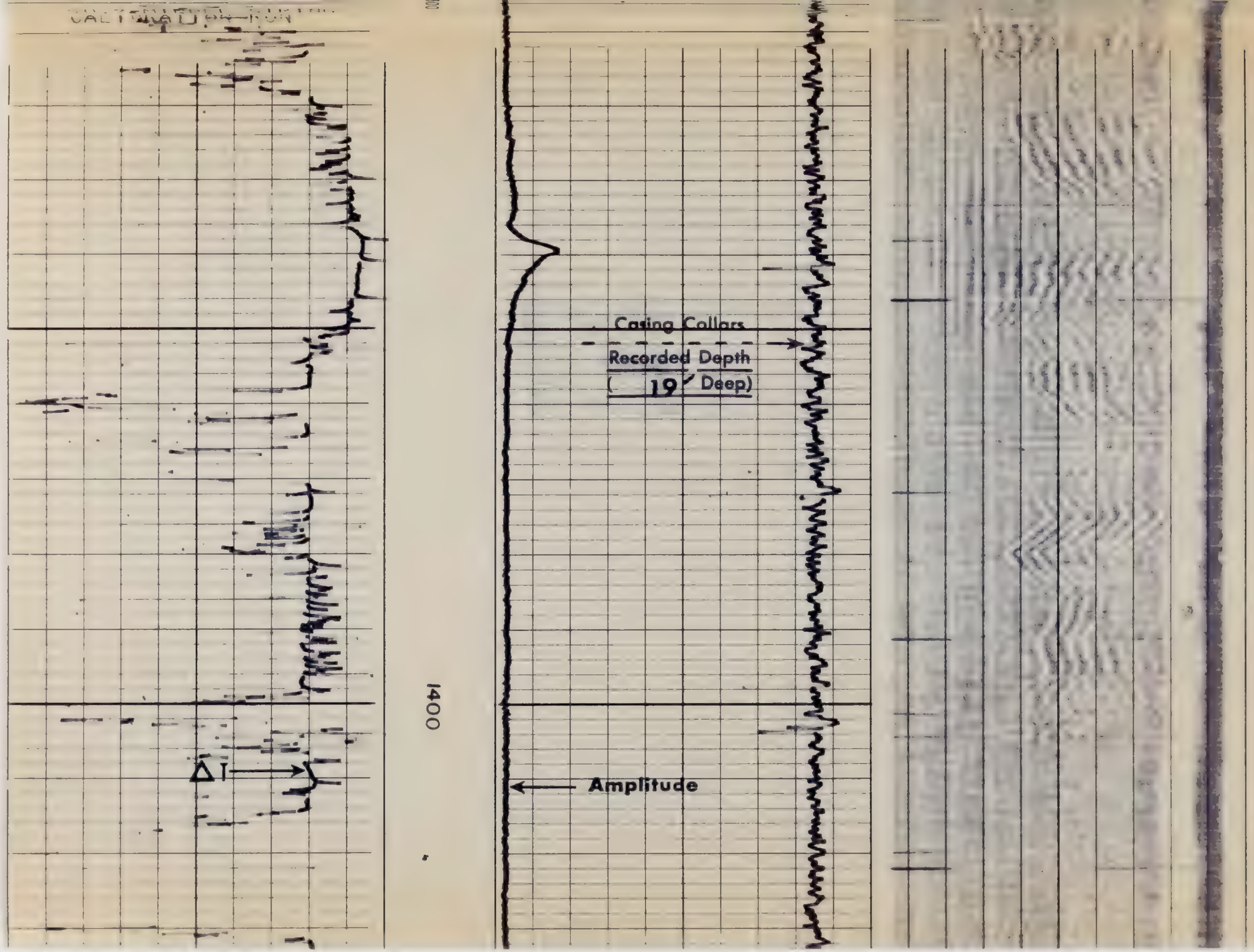

Amplitude
Casing Collars
Recorded Depth
(19' Deep)
0900
1000
ΔT
GR

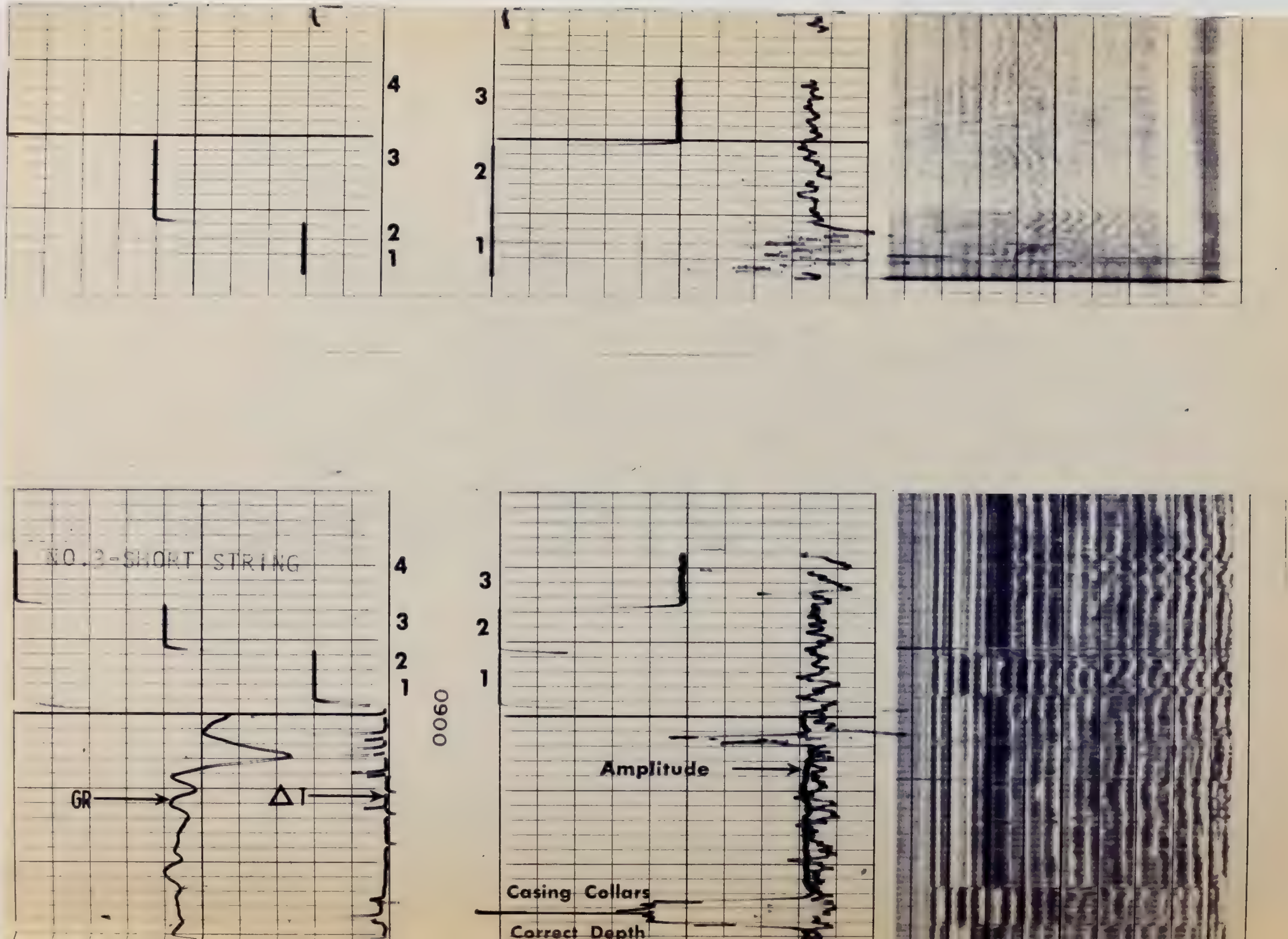

1100
PROBABLE CEMENT TOP

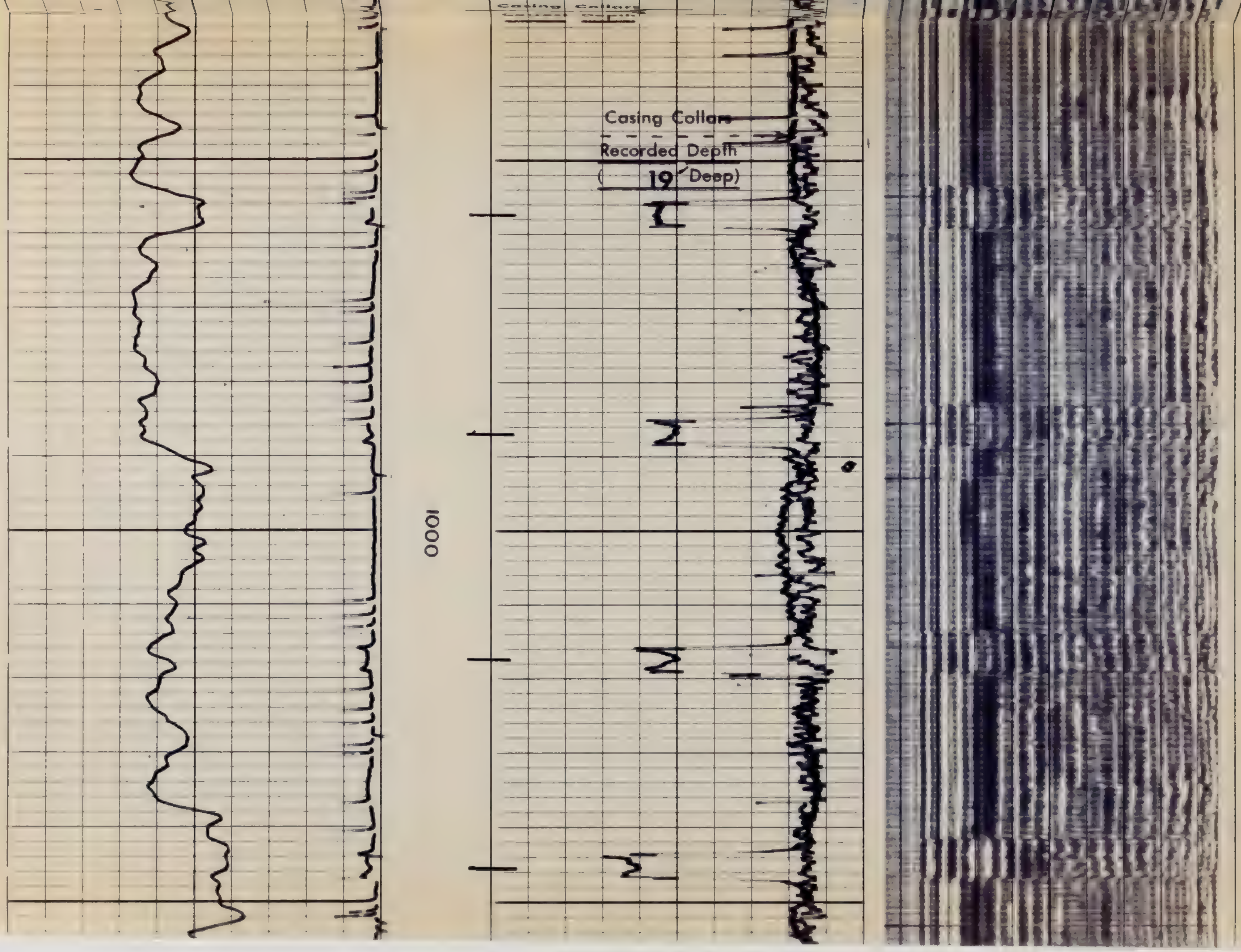

1200

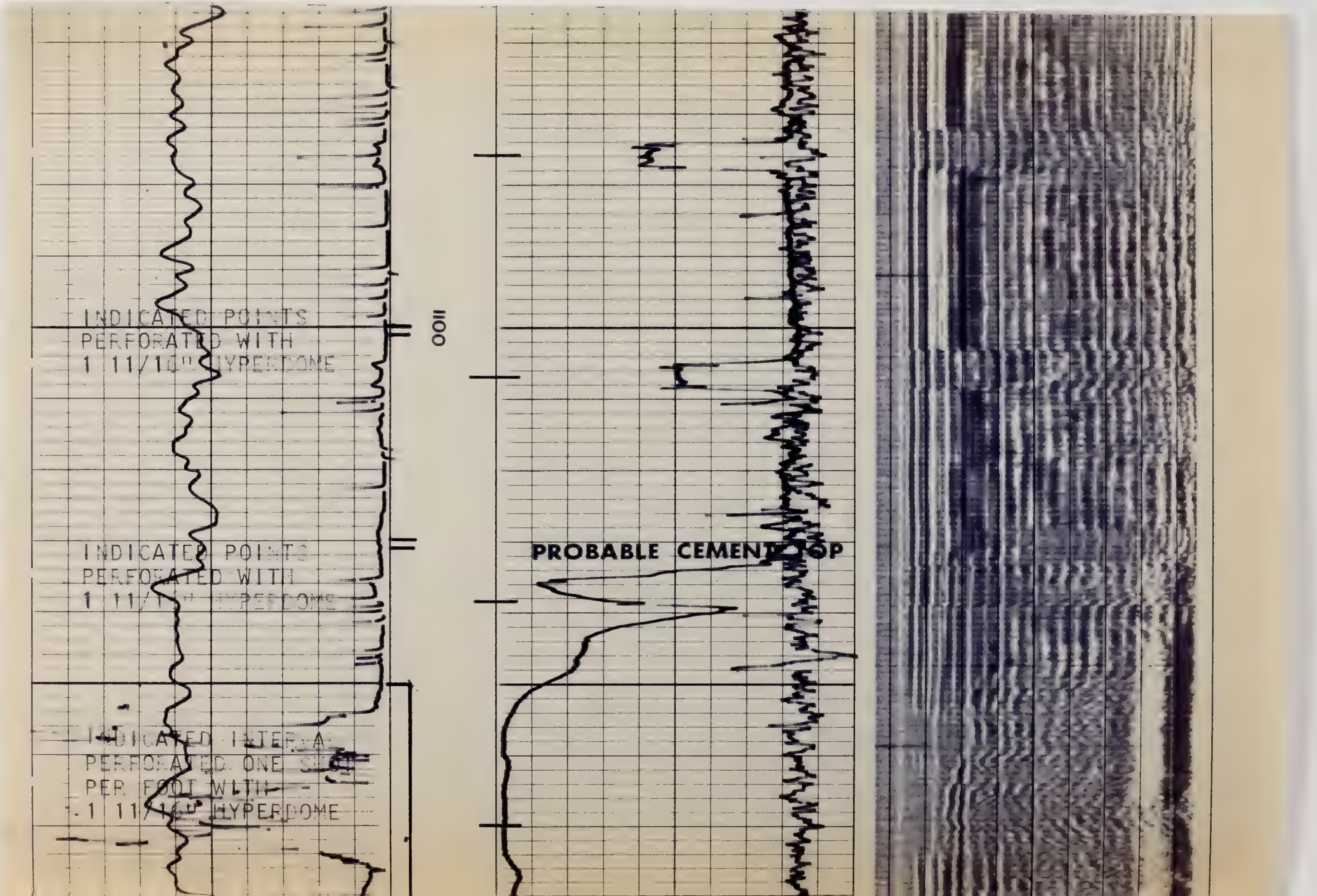

Casing Collars
1300

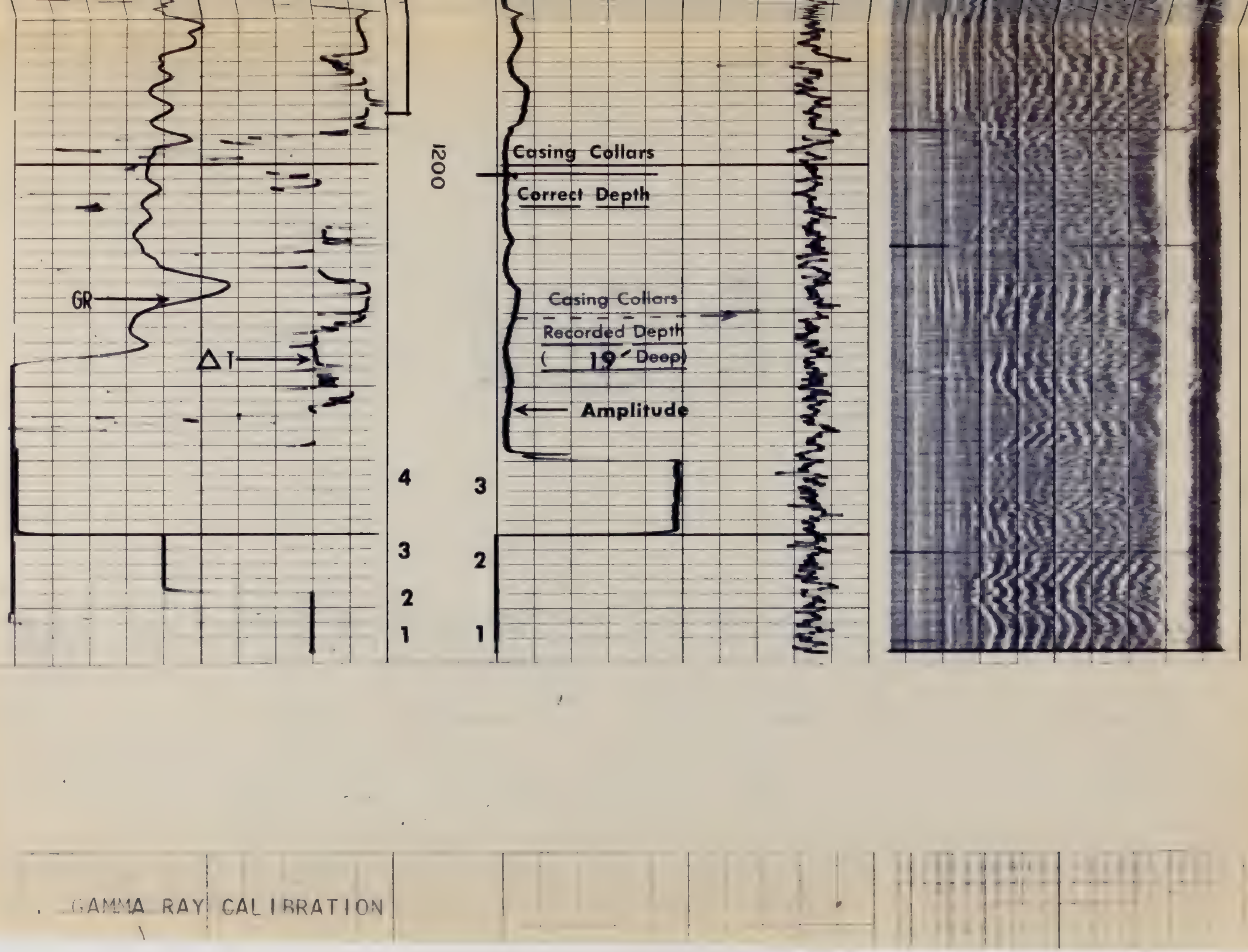

Correct Depth
Casing Collars
Recorded Depth
(19' Deep)
Amplitude
1400
1300
ΔT
GR
INDICATED INTERVAL
PERFORATED 2 SHOTS
PER FOOT WITH
1 11/16" HYPERJON
NO.2 MIDDLE STRING
CALIBRATION RUN

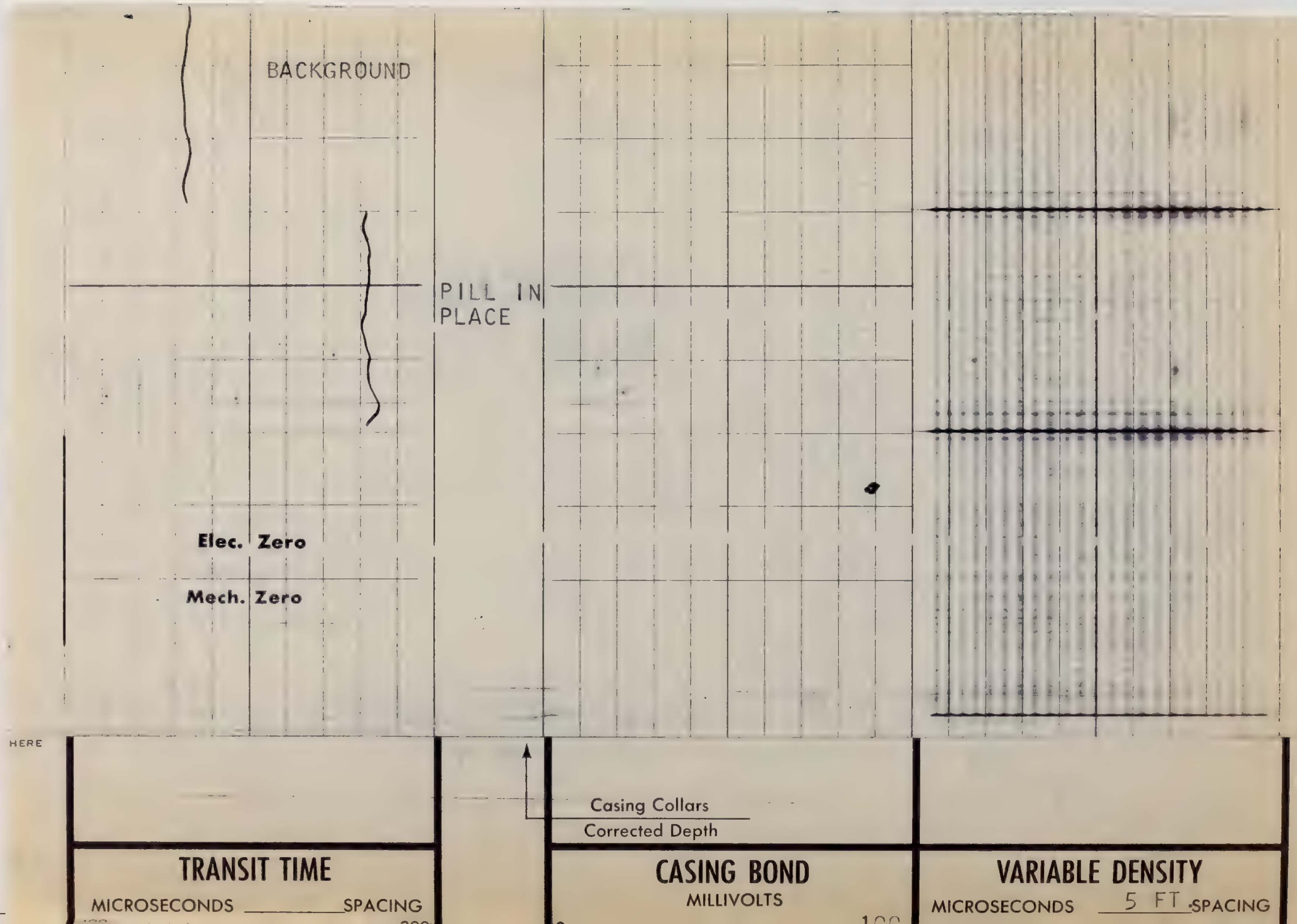

Casing Collars
Recorded Depth
(19' Deep)
1400
ΔT
Amplitude


4
3
2
1
3
2
1
NO.3-SHORT STRING
4
3
2
1
0900
3
2
1
GR
ΔT
Amplitude
Casing Collars
Correct Depth


Casing Collars
Recorded Depth
(19' Deep)
1000


INDICATED POINTS
PERFORATED WITH
1 11/16" HYPERDOME
1100
INDICATED POINTS
PERFORATED WITH
1 11/16" HYPERDOME
PROBABLE CEMENT TOP
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH
1 11/16" HYPERDOME


GR
ΔT
1200
Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(19' Deep)
Amplitude
4
3
2
1
3
2
1
GAMMA RAY CALIBRATION


BACKGROUND
PILL IN PLACE
Elec. Zero
Mech. Zero
HERE
Casing Collars
Corrected Depth
TRANSIT TIME
MICROSECONDS
SPACING
CASING BOND
MILLIVOLTS
VARIABLE DENSITY
MICROSECONDS
5 FT
SPACING

TRANSIT TIME		CASING BOND	VARIABLE DENSITY
MICROSECONDS SPACING 400 200		MILLIVOLTS 0	MICROSECONDS SPACING 200 1200
GAMMA RAY API UNITS	DEPTH		

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SG NO.6

FIELD

COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 1432-1467
SCHL. TD 1458-1475
DRLR TD 2220-1474
Elev:
KB ----
DF ----
GL 6888

CEMENT BOND CALIBRATION CODING

	Δt	AMPLITUDE
1.	MECHANICAL ZERO	MECHANICAL ZERO
2.	240 μ sec	ELECTRICAL ZERO
3.	320 μ sec	CALIBRATE
4.	400 μ sec	

COUNTY RIO BLANCO
FIELD or LOCATION [illegible]

Permane
Log Mea
Drilling

Date
Run No.
Pipe Stri
Pipe Stri
Type Or

Type flu
Salini
Densi
Level
Max rec
Operati
Recorde
Witness

Bit

Schlumberger

ORIENTED PERFORATING RECORD AND CASING COLLAR LOG

COUNTY RIO BLANCO
FIELD or LOCATION SORGHUM GULCH
WELL S. G. NO. 6
COMPANY ATLANTIC RICHFIELD COMPANY

COMPANY ATLANTIC RICHFIELD COMPANY

WELL S.G. NO.6

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

Location:
2523 FSL -
2251 FWL
Sec. 7 Twp. 3S Rge. 96W

Other Services:
CBL-GR-VDL

Permanent Datum: GROUND LEVEL ; Elev.: 6888
Log Measured From GL , 0 Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B. ----
D.F. ----
G.L. 6888

Date	9/16/74
Run No.	ONE
Pipe String No.	ONE/TWO/THREE
Pipe String Ident.	LONG/MIDDLE/SHORT
Type Orienting	POWERED
Type fluid in hole	WATER
Salinity, PPM Cl.	----
Density	----
Level	FULL
Max rec. temp., deg F.	----
Operating rig time	66 HOURS
Recorded by	ST. AUBYN
Witnessed by	MR. ROSS

BORE-HOLE RECORD			CEMENTING RECORD				
Bit	From	To		Type	Wgt.	From	To
$6\frac{1}{4}$	59	2220	Primary				
			Squeeze				

reference data were furnished by the customer

FOLD HERE

The well name, location and borehole reference data were furnished by the customer.

EQUIPMENT DATA			
Hoist Truck No.	3362	Rotator Size	
Inst. Truck No.	3362	Rotator No.	
Tool Serial No.		Indexer Type	
Location	VERNAL	Indexer No.	

DEPTHS RELATE TO

Radioactivity Measurements ☒
Schlumberger Line Measurements ☐

CASING COLLARS	

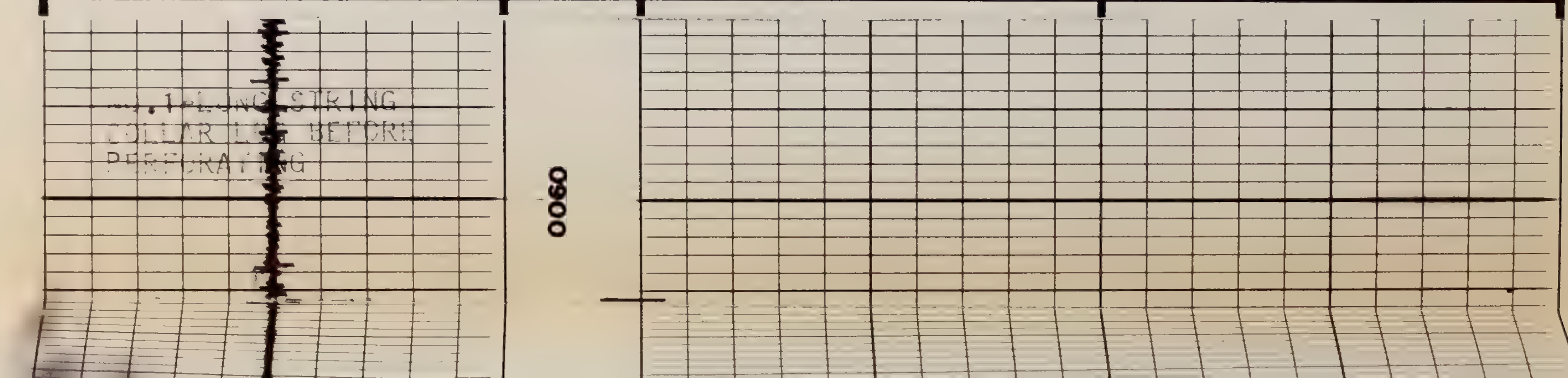
PERFORATING DATA					LOGGING DATA				
Depths		No. Shots	Gun Size	Gun Type	Time Const.	Sens. Setting	Zero Shift	Calib. Sens.	Calib. Defl.
From	To								
NO.1-LONG STRING									
1625	2161	537	1 11/16"	HYPERDOME					
NO. 2-MIDDLE STRING									
1430	1470	41	1 11/16"	HYPERDOME					
NO.3-SHORT STRING									
1160	1190	43	1 11/16"	HYPERDOME					

PIPE STRING RECORD

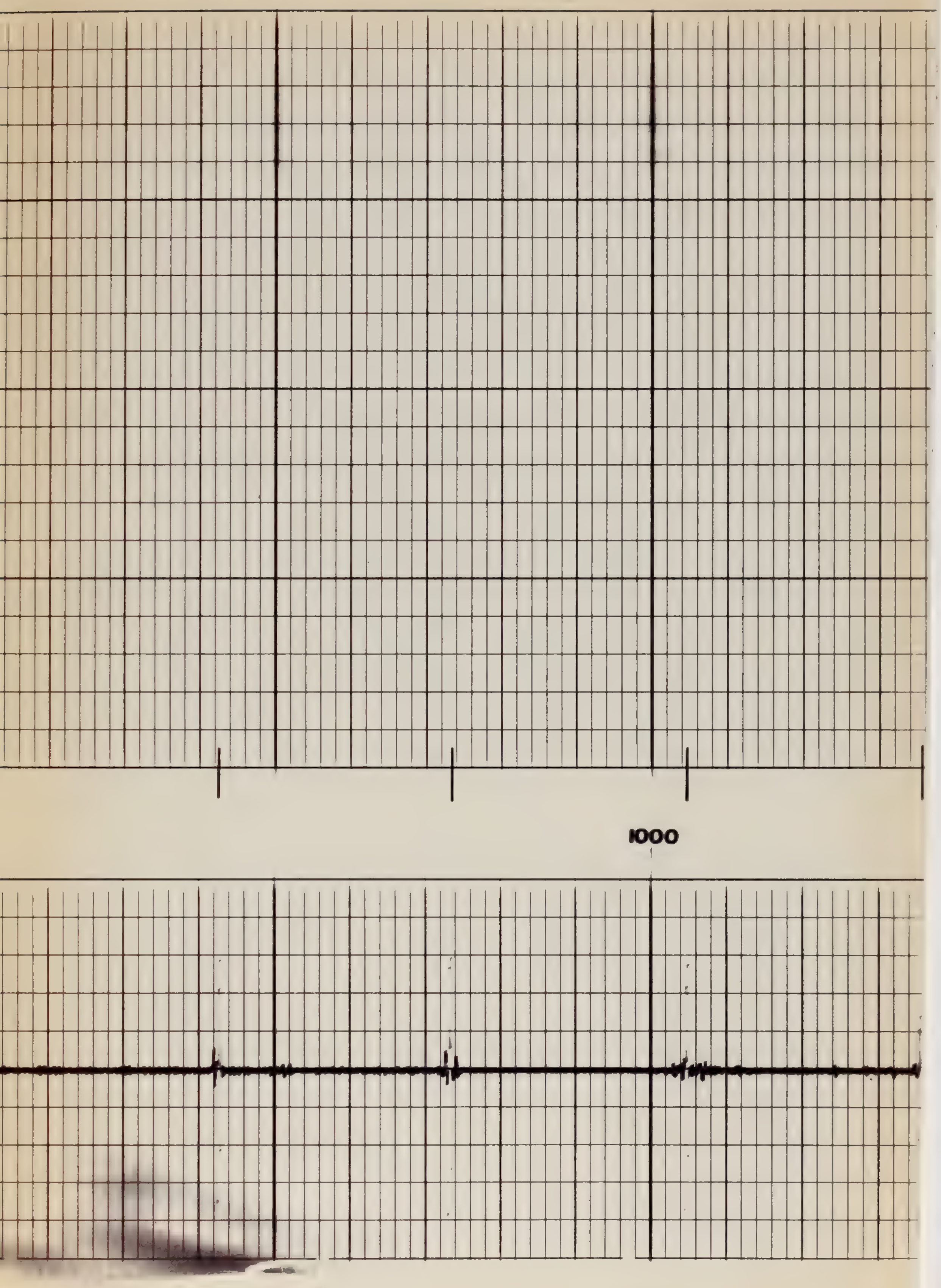
Number	1	2	3	4
Identific't'n	LONG	MIDDLE	SHORT	
Size	2 3/8	2 3/8	2 3/8	
Weight	4.7	4.7	4.7	
Depth	2220	1466	1194	

Remarks:

CASING COLLAR LOG BEFORE PERFORATION	DEPTHS		



NO.1-LONG STRING COLLAR LOG BEFORE PERFORATING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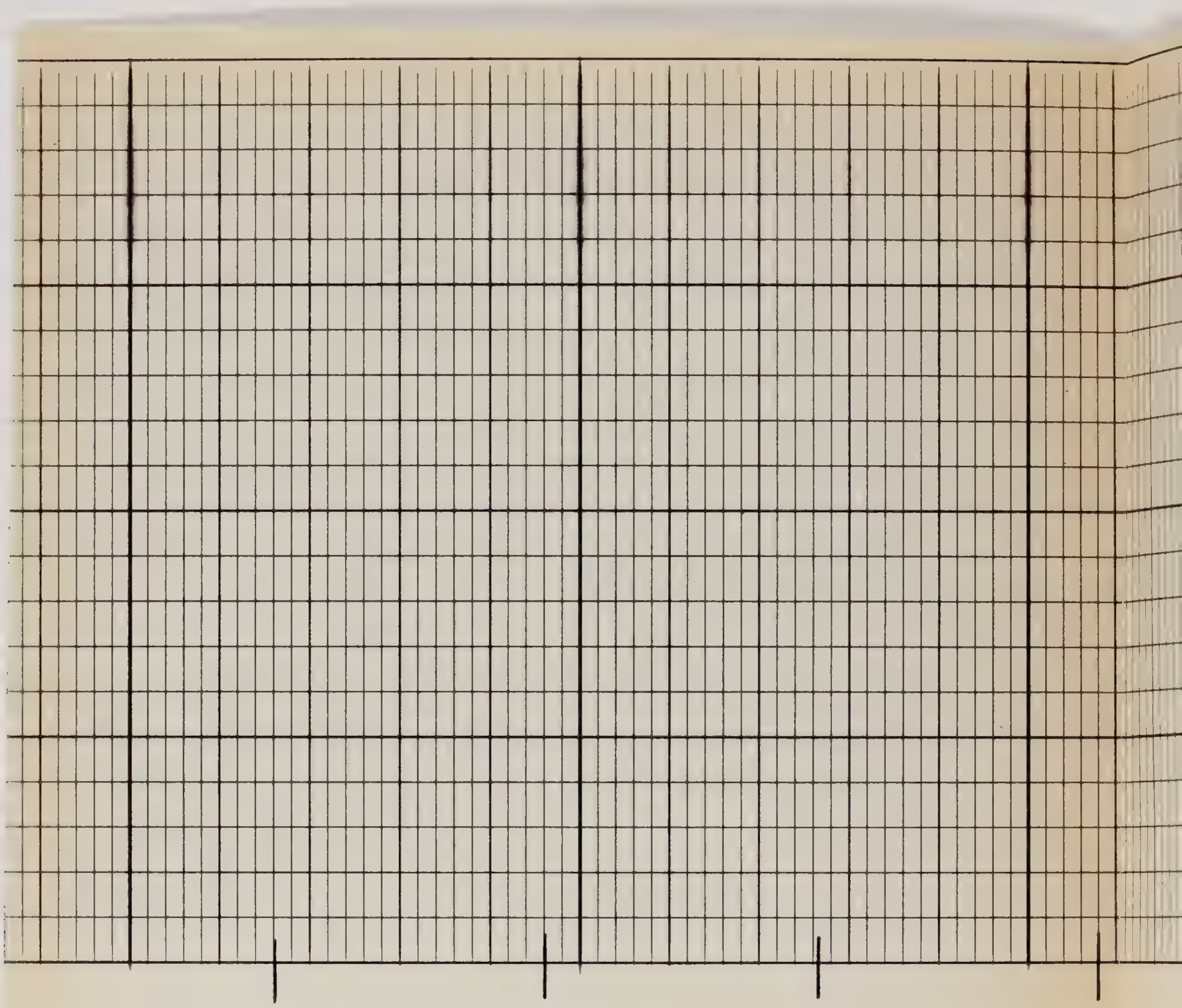
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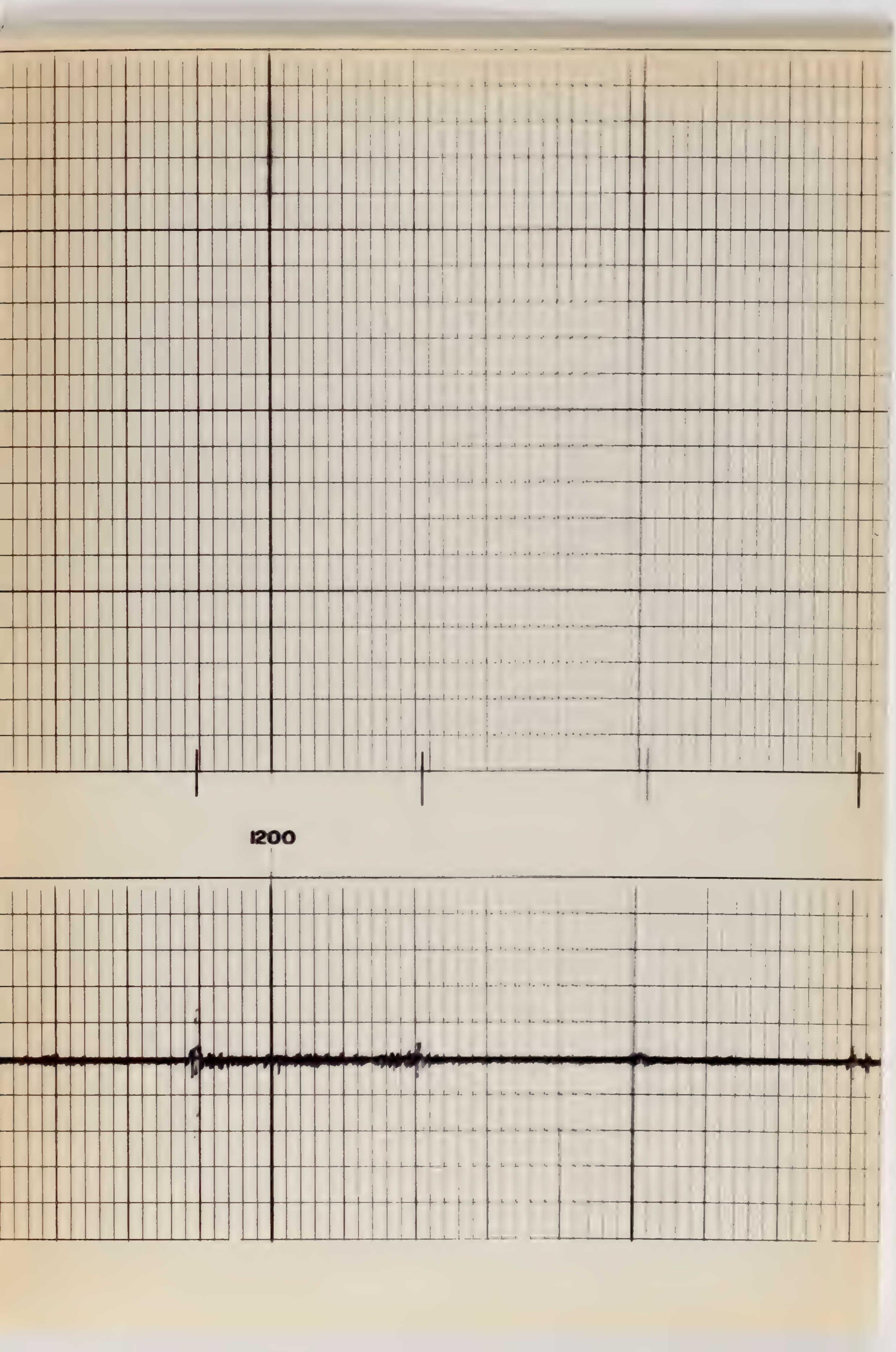
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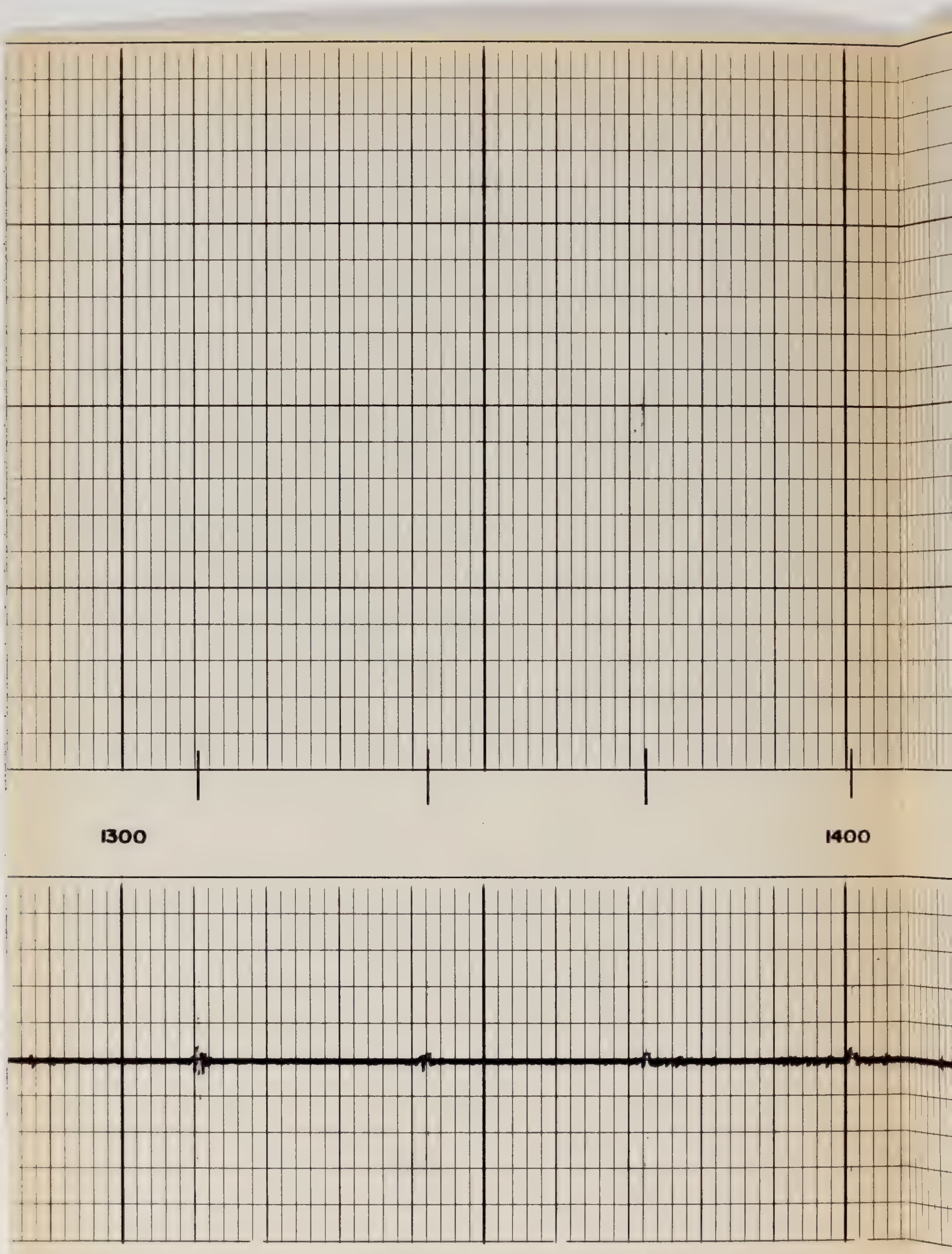
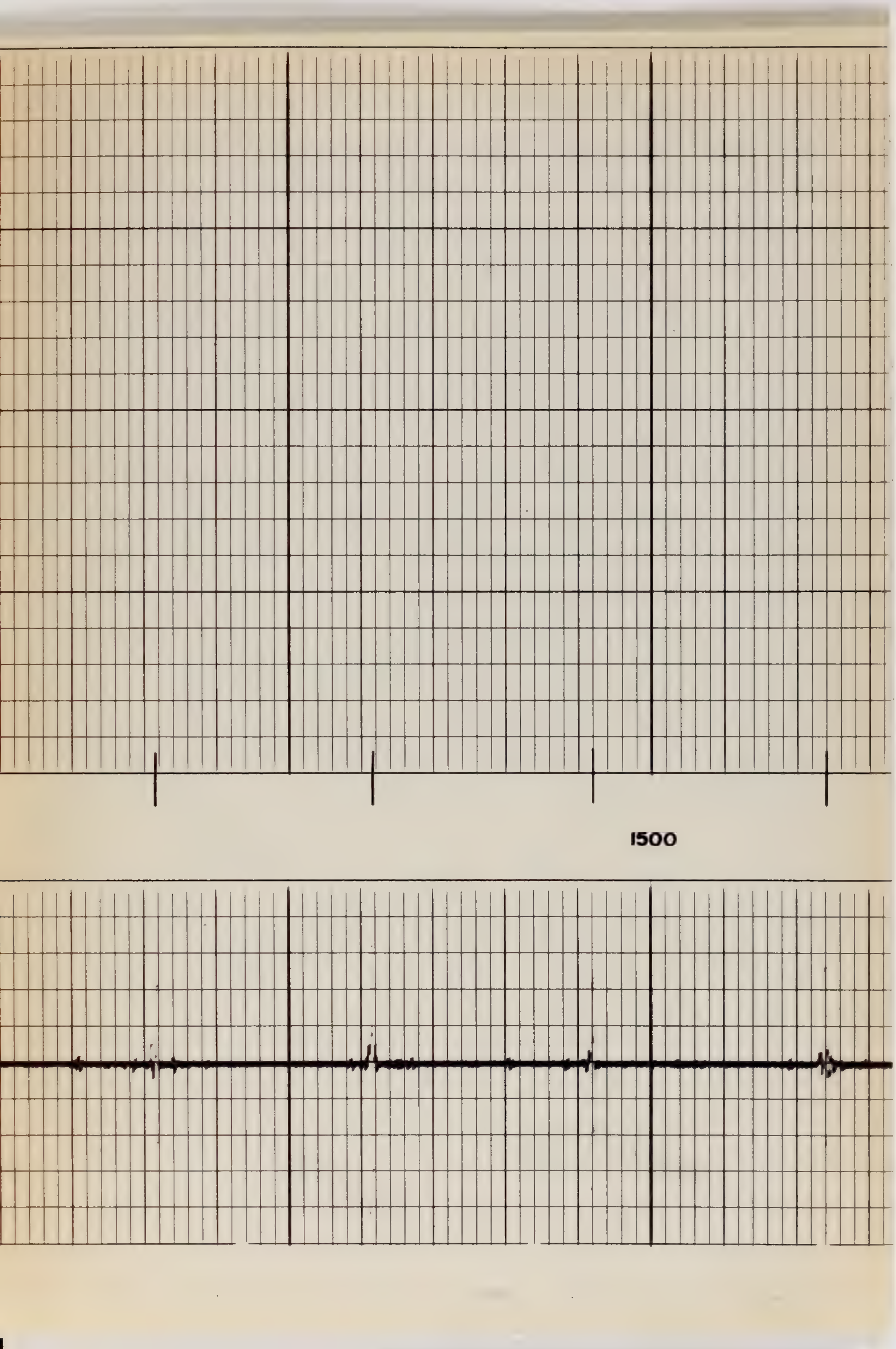

1300
1400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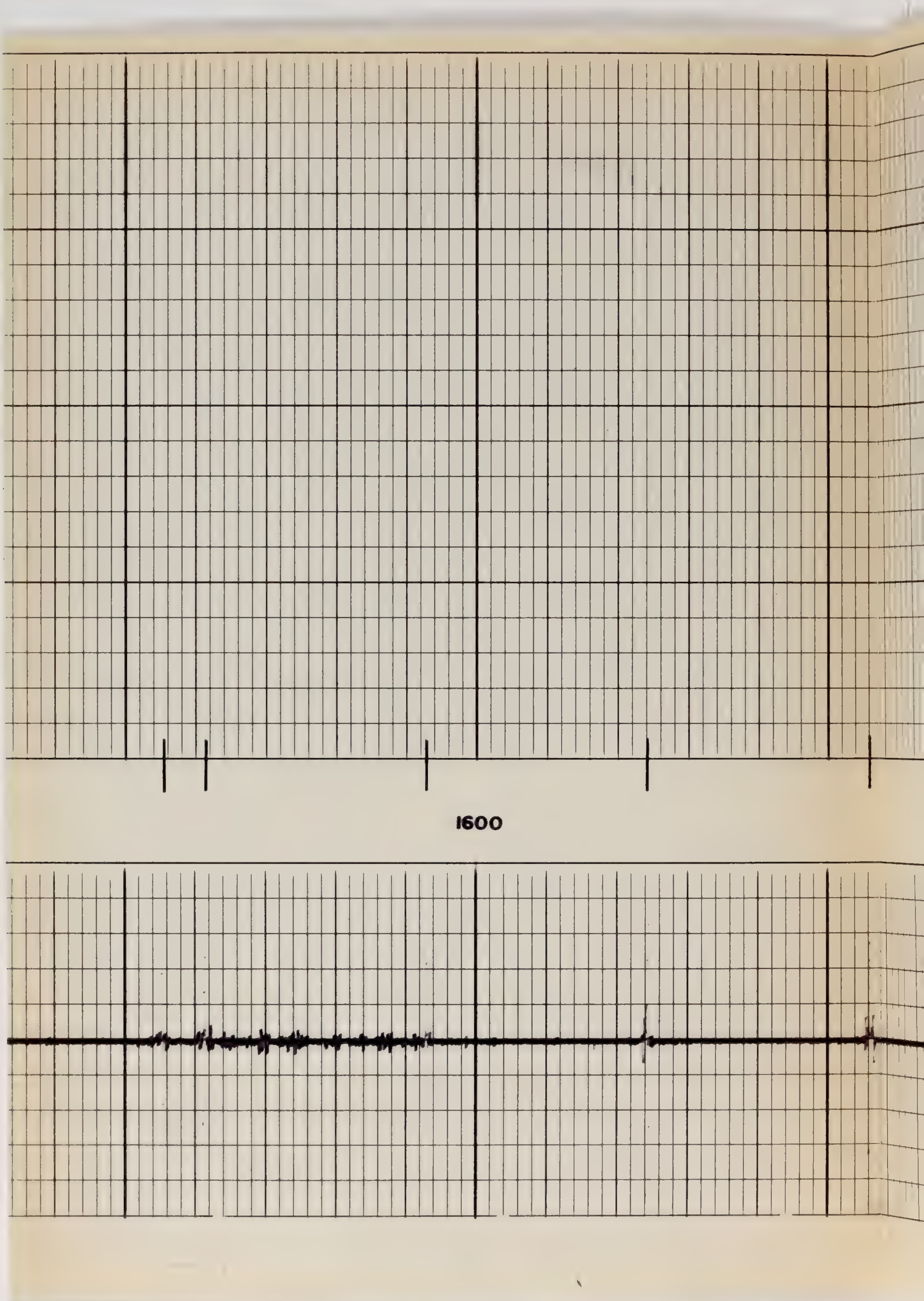
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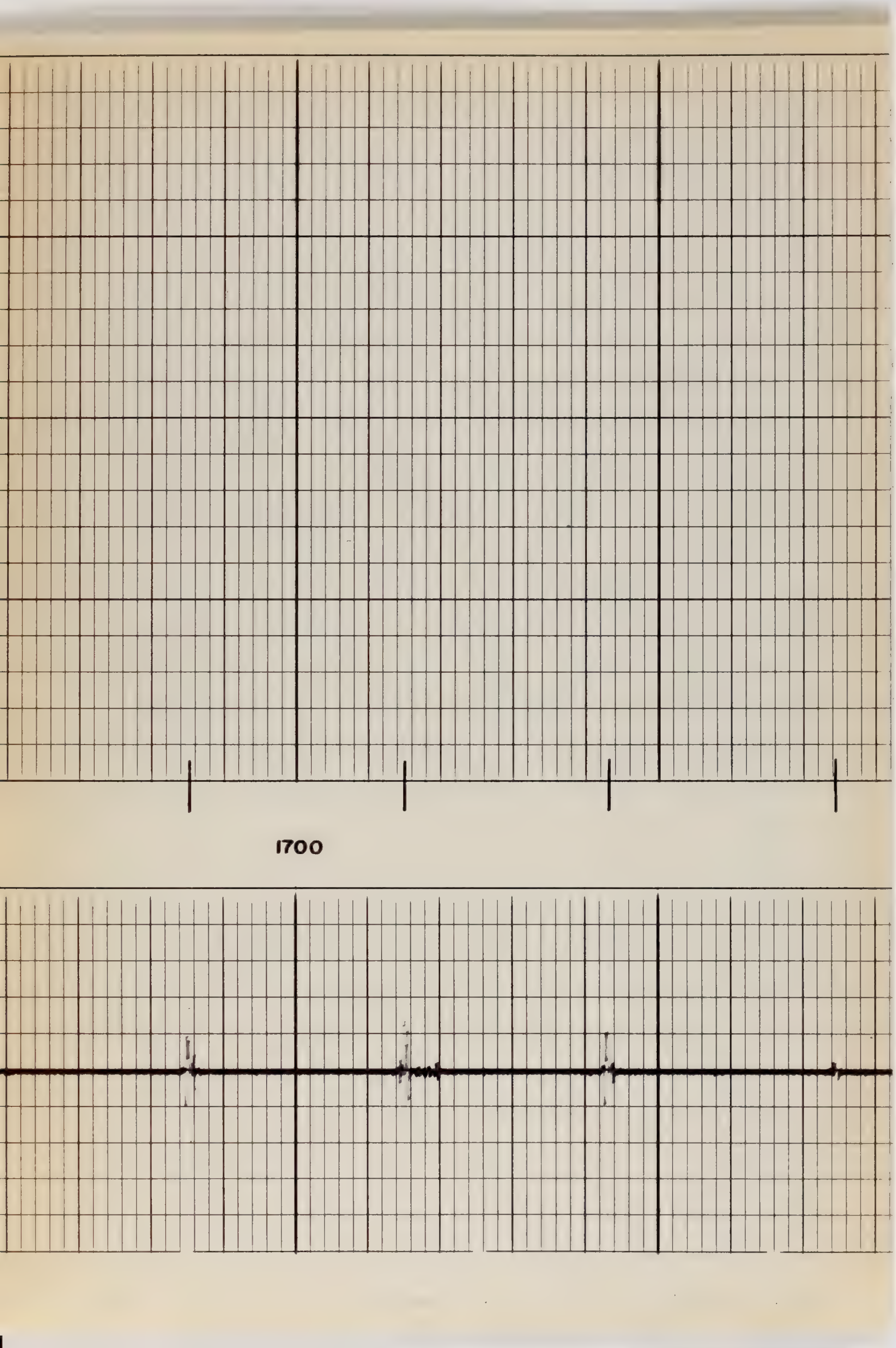
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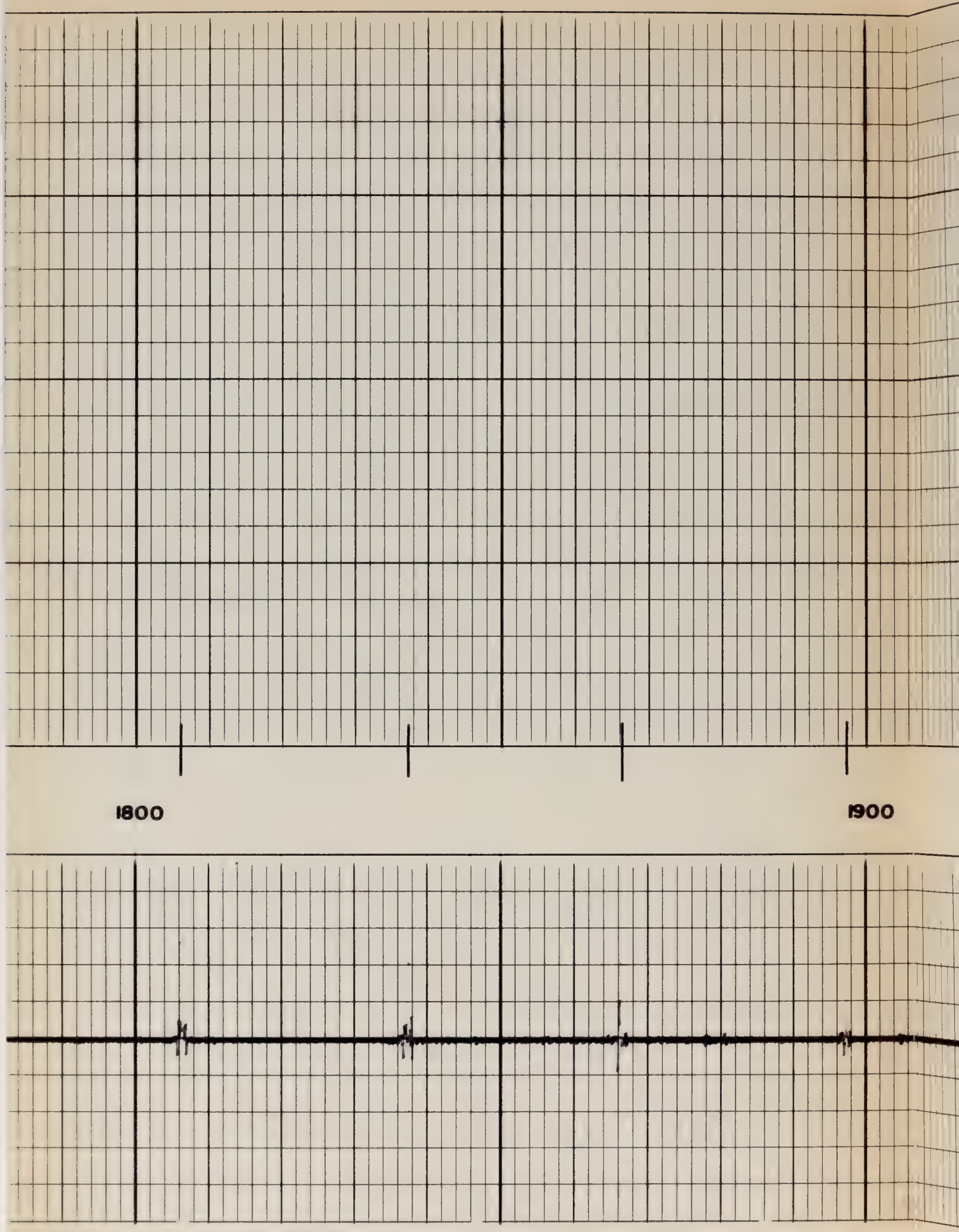
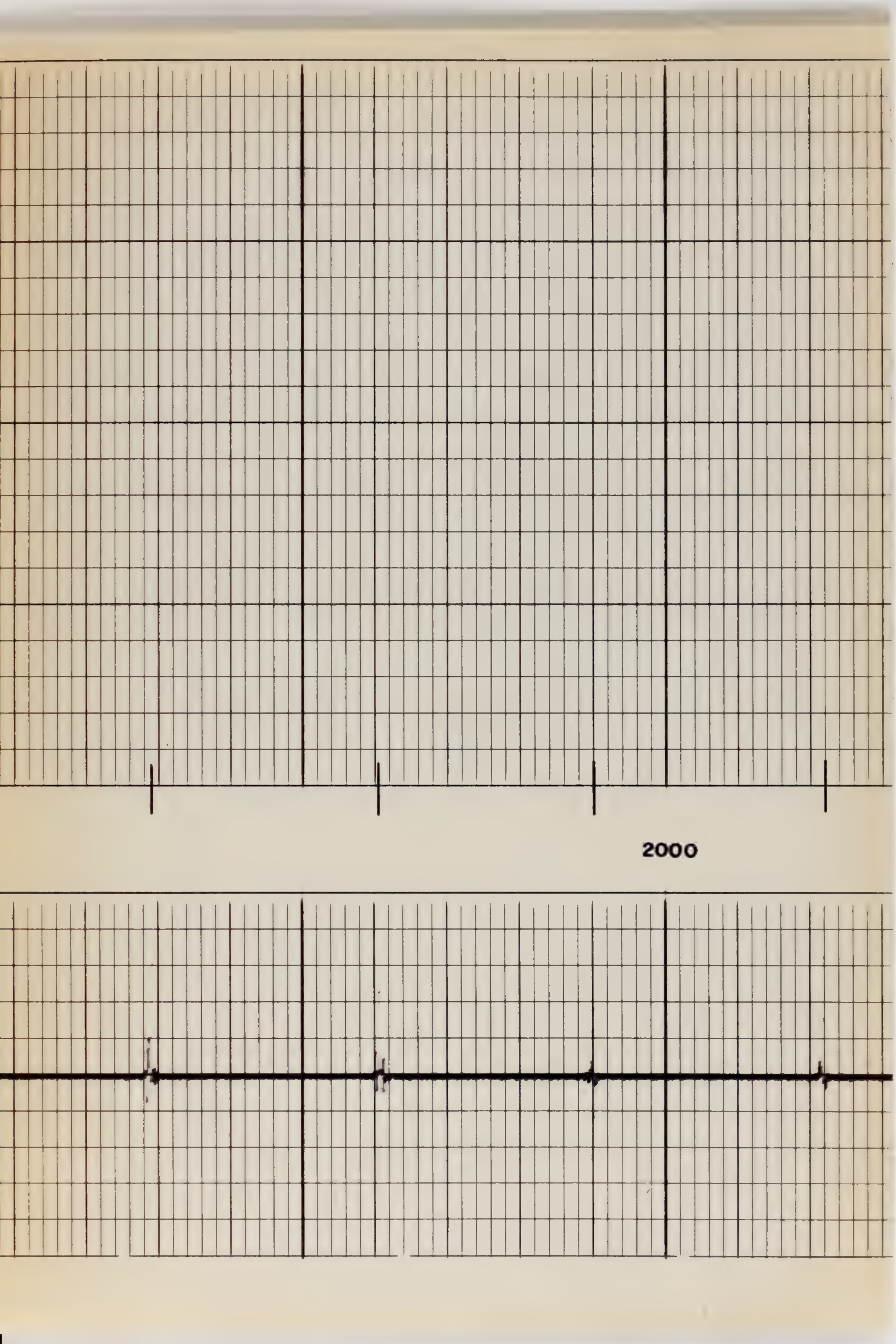

1800
1900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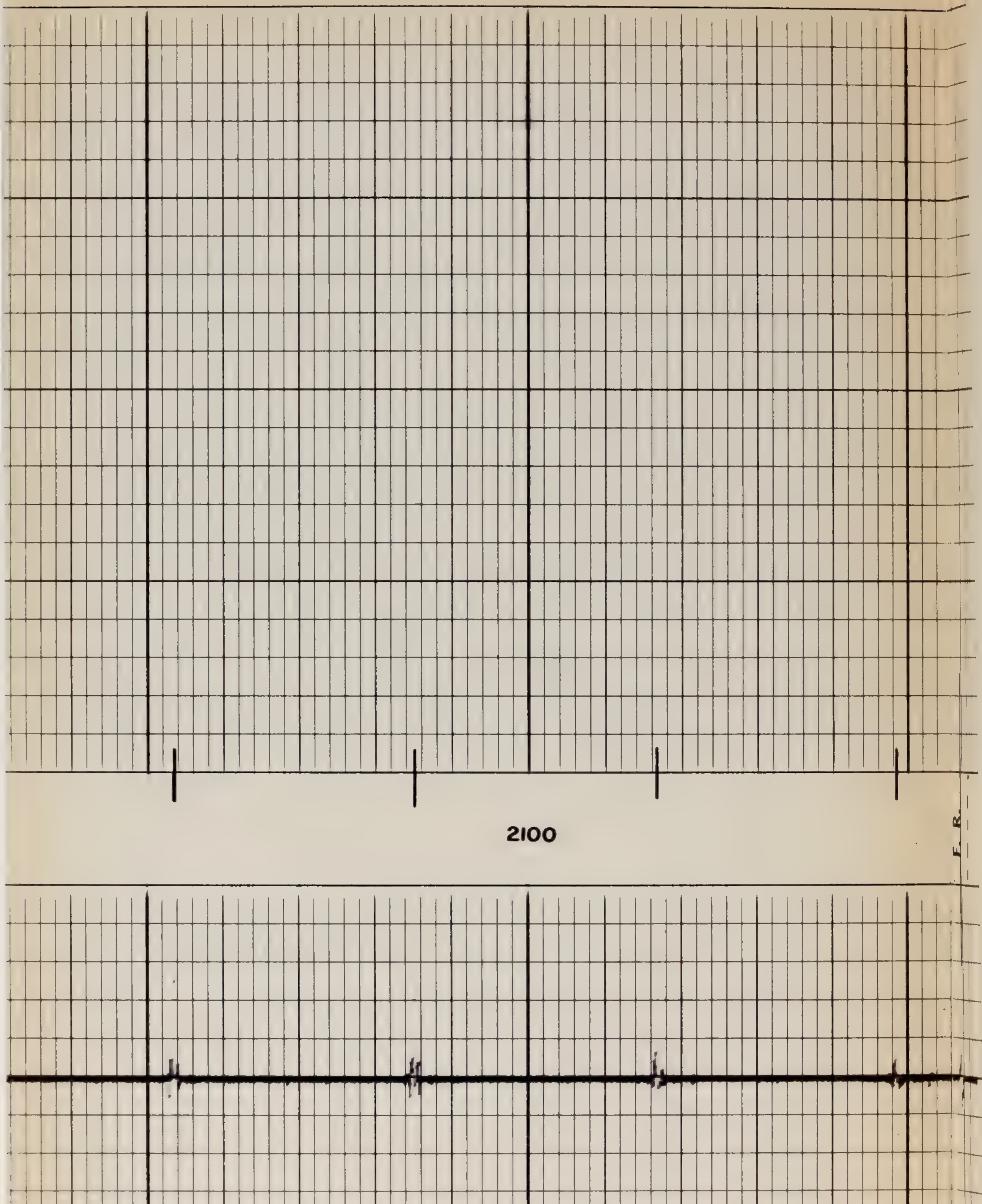
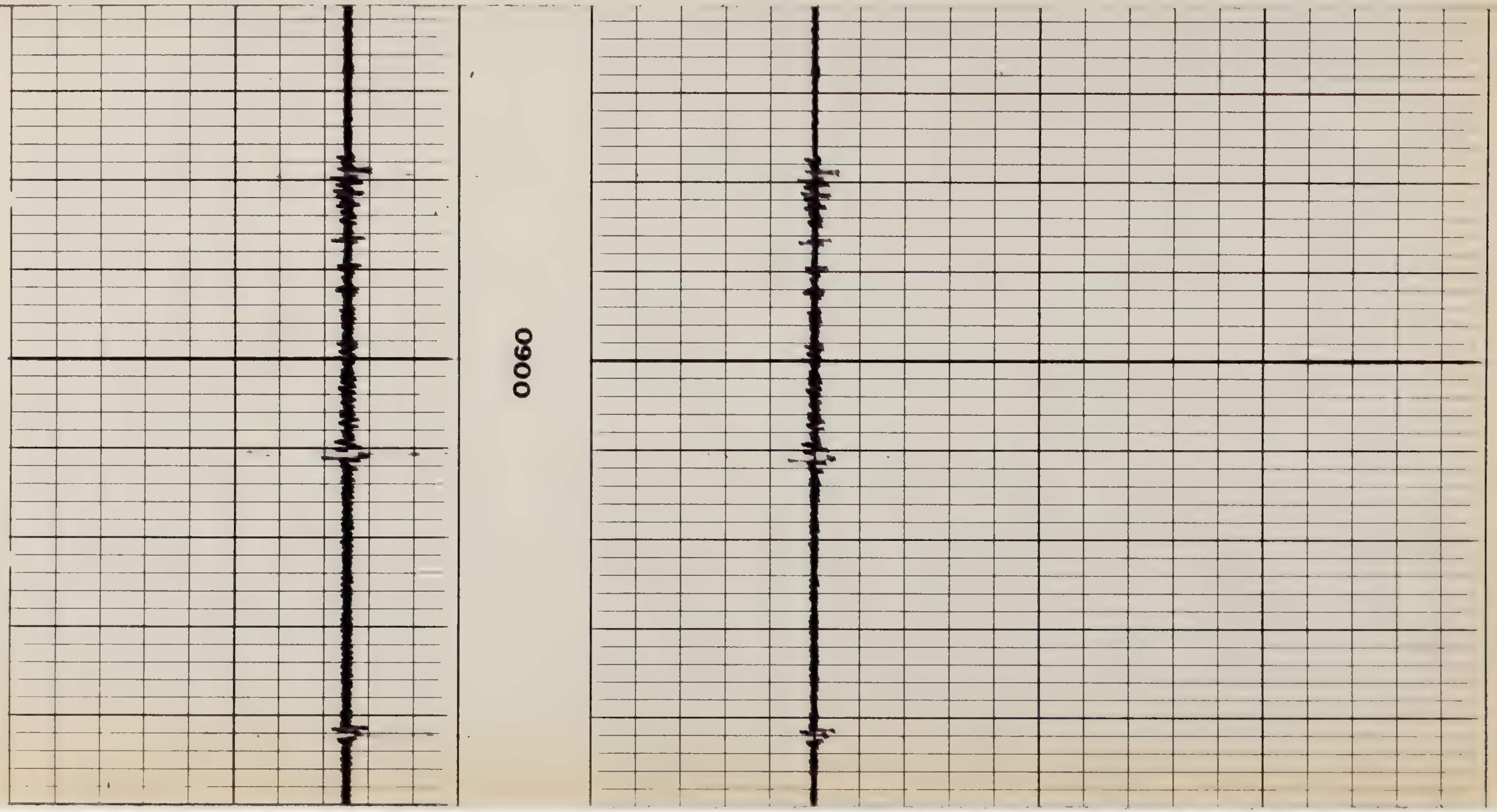
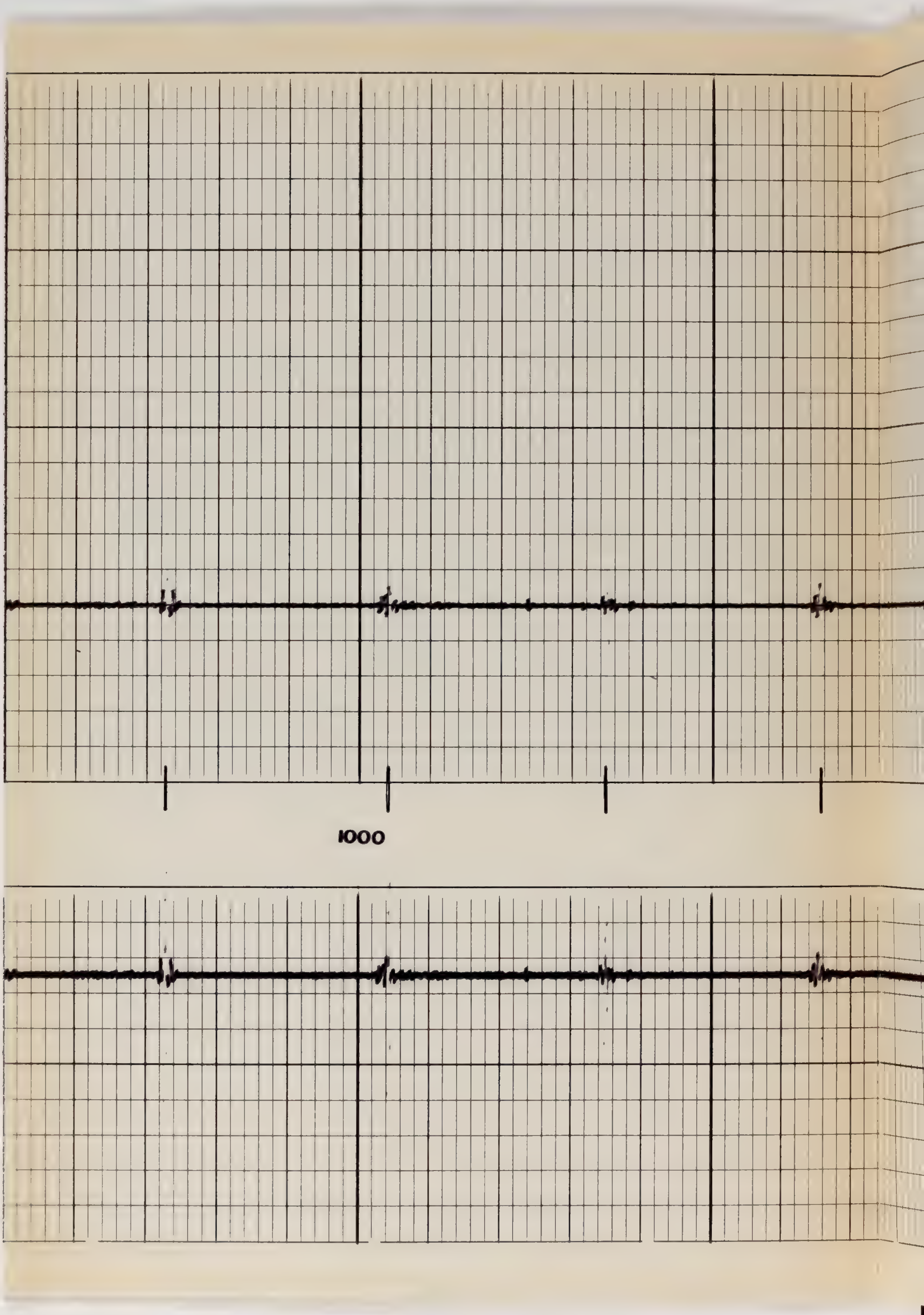

2100
F. R.

NO.1-[illegible] STRING-COLLAR LOG RUN AFTER PERFORATING

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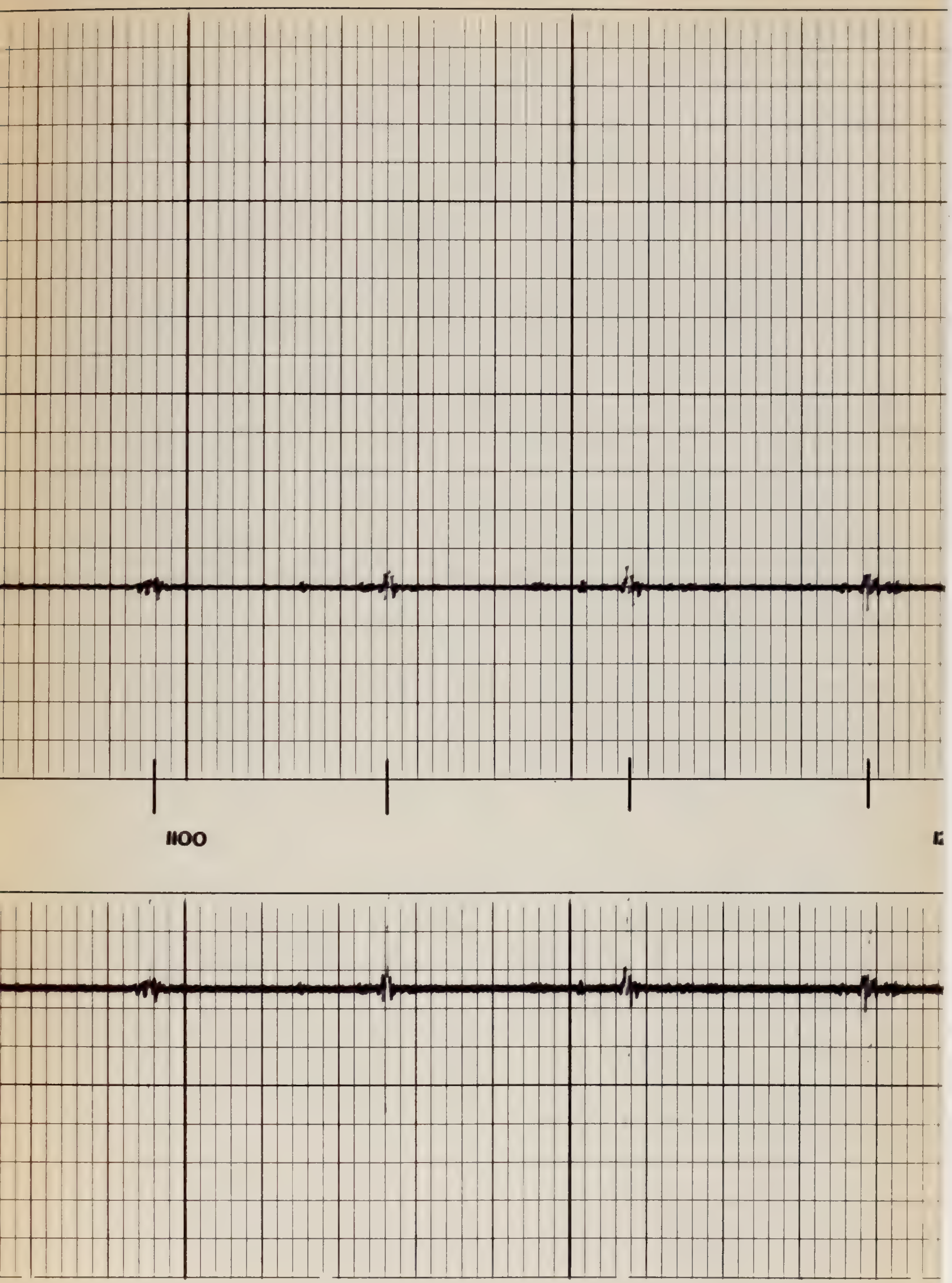
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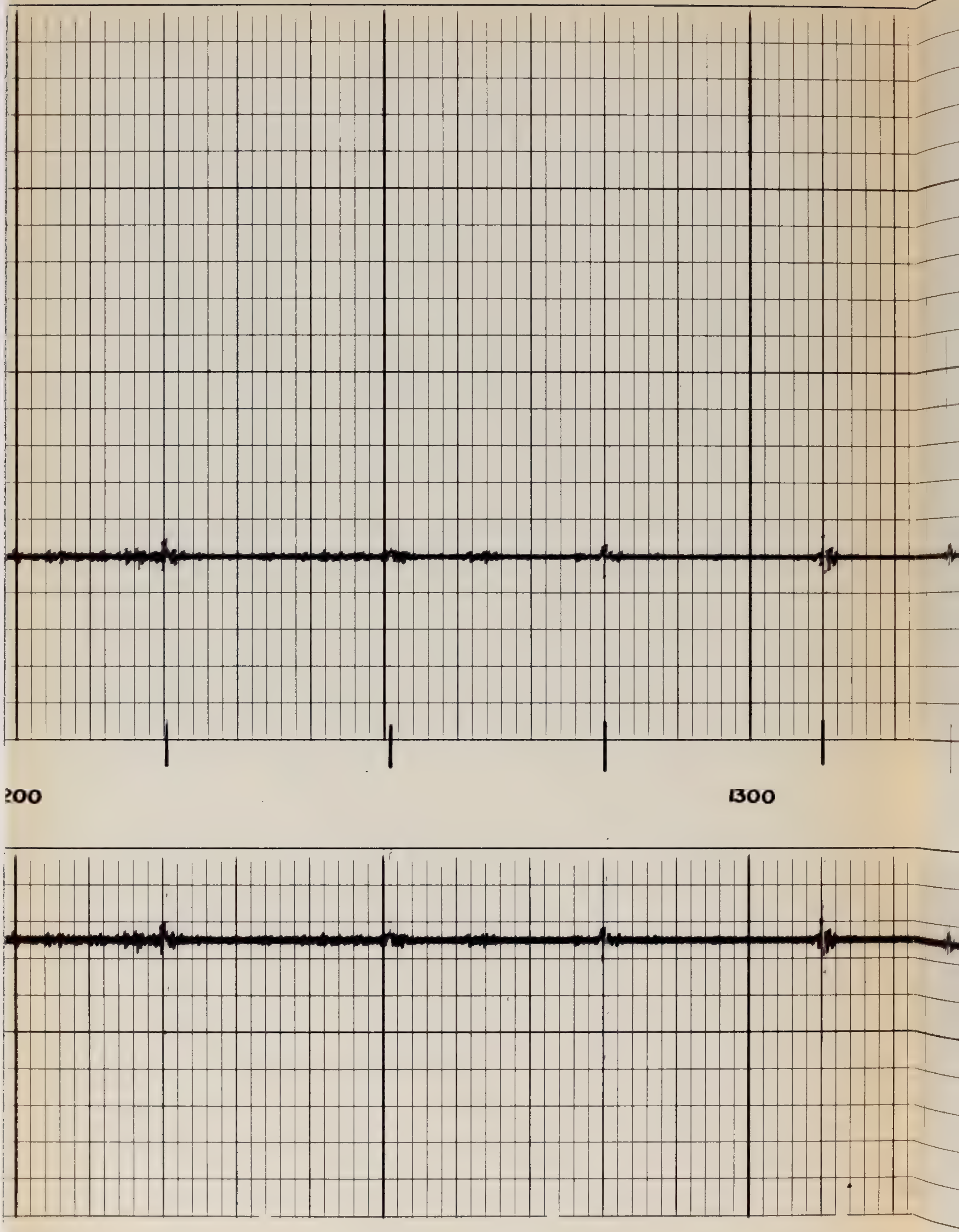
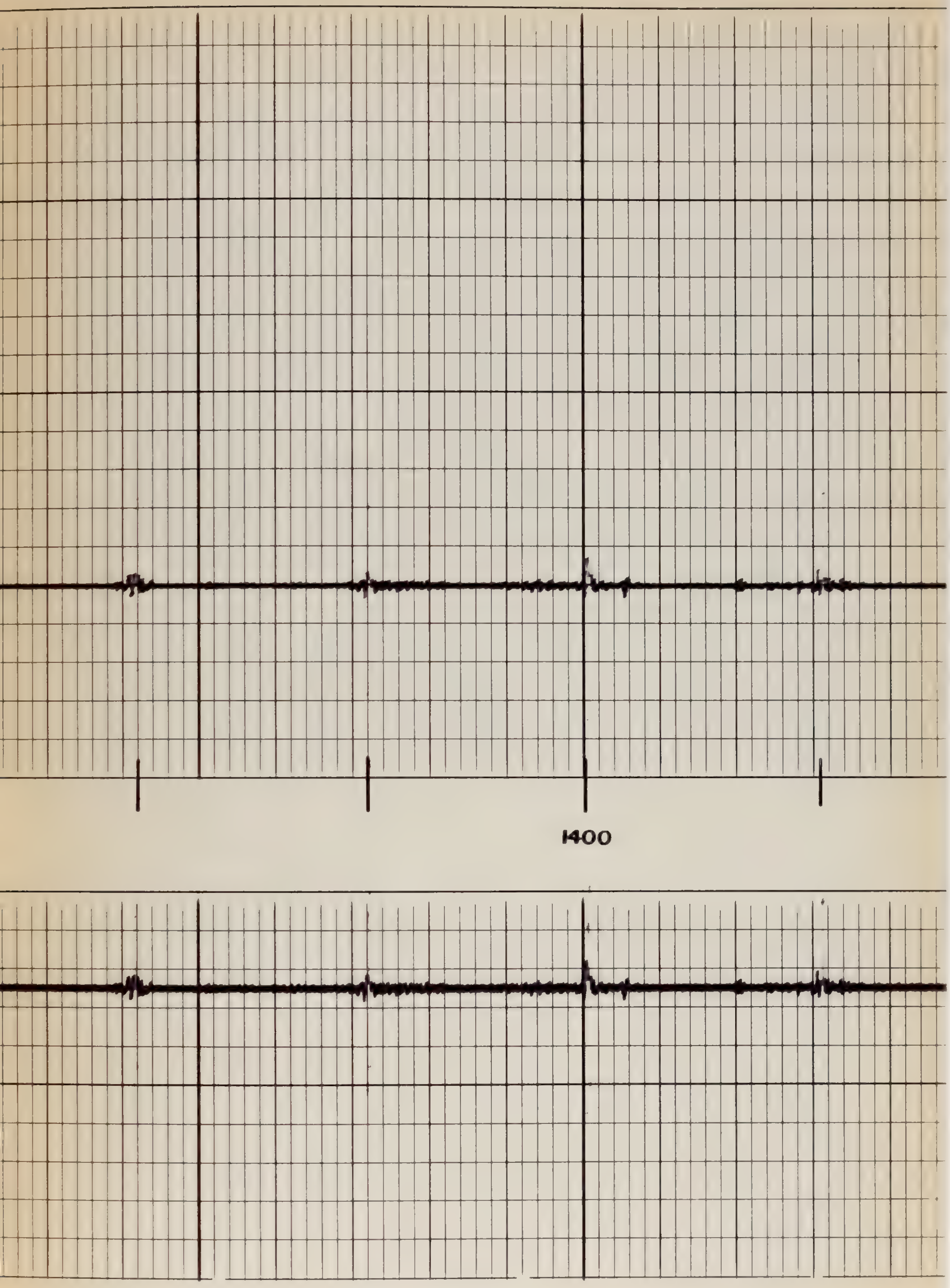

200
1300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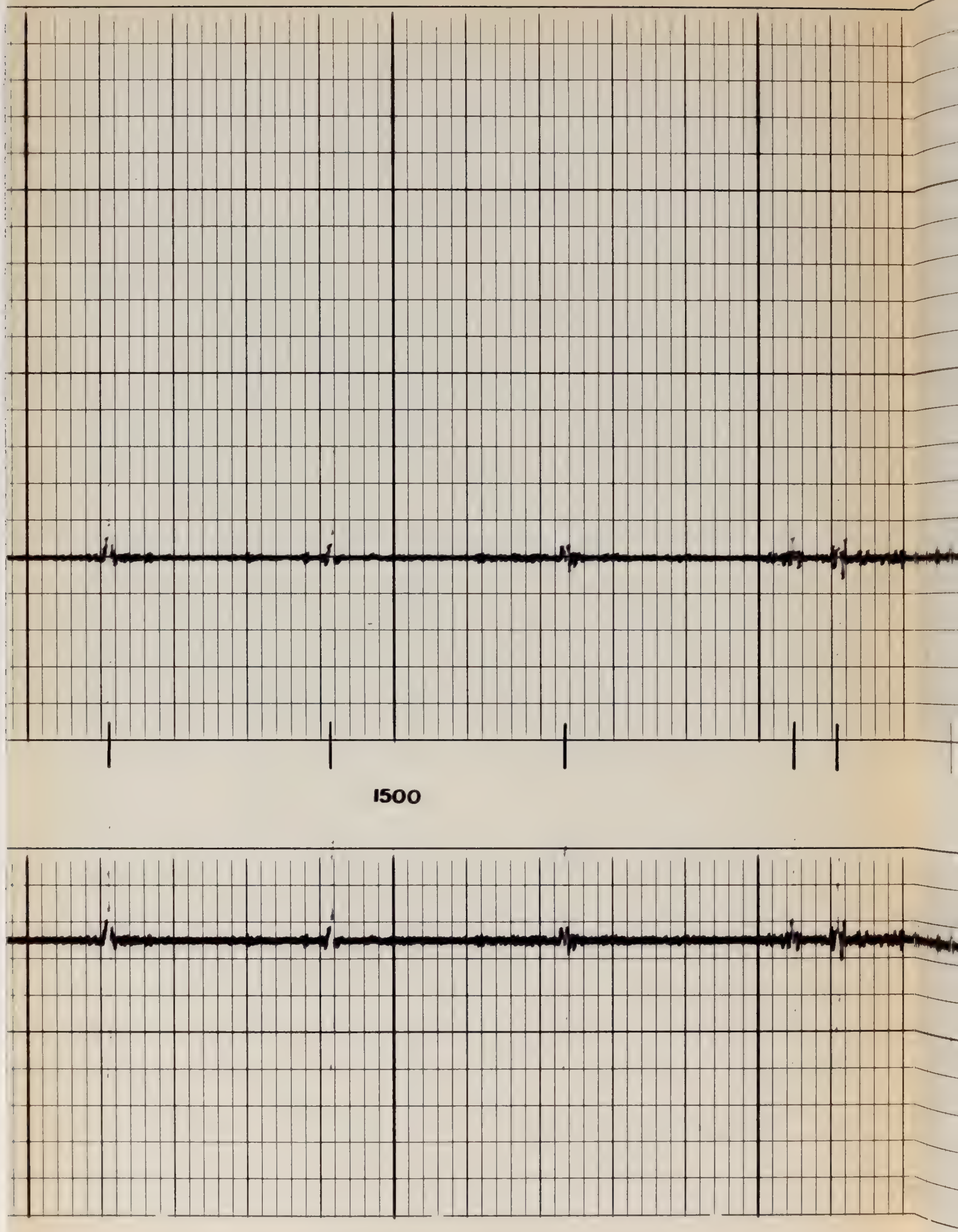

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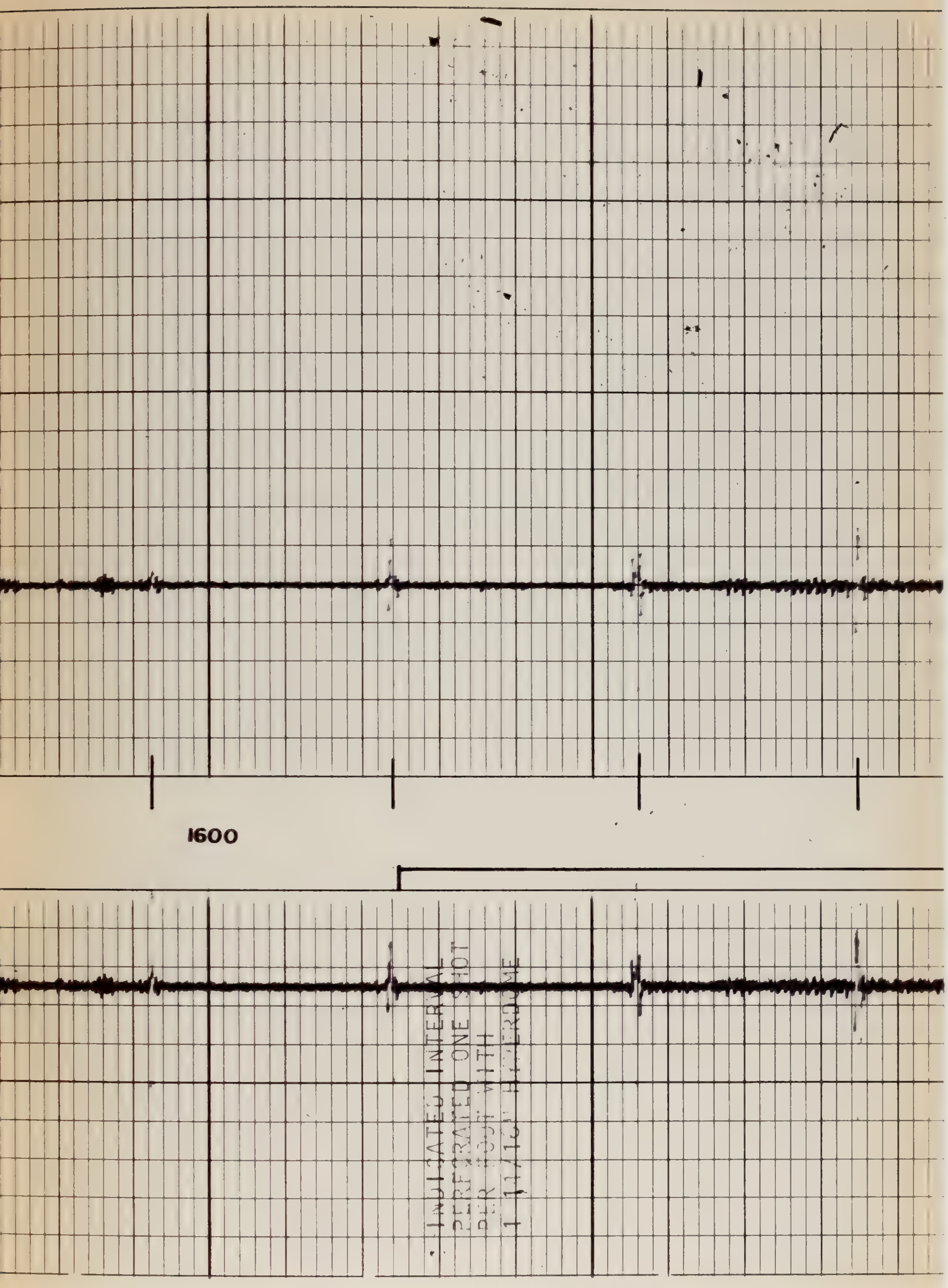
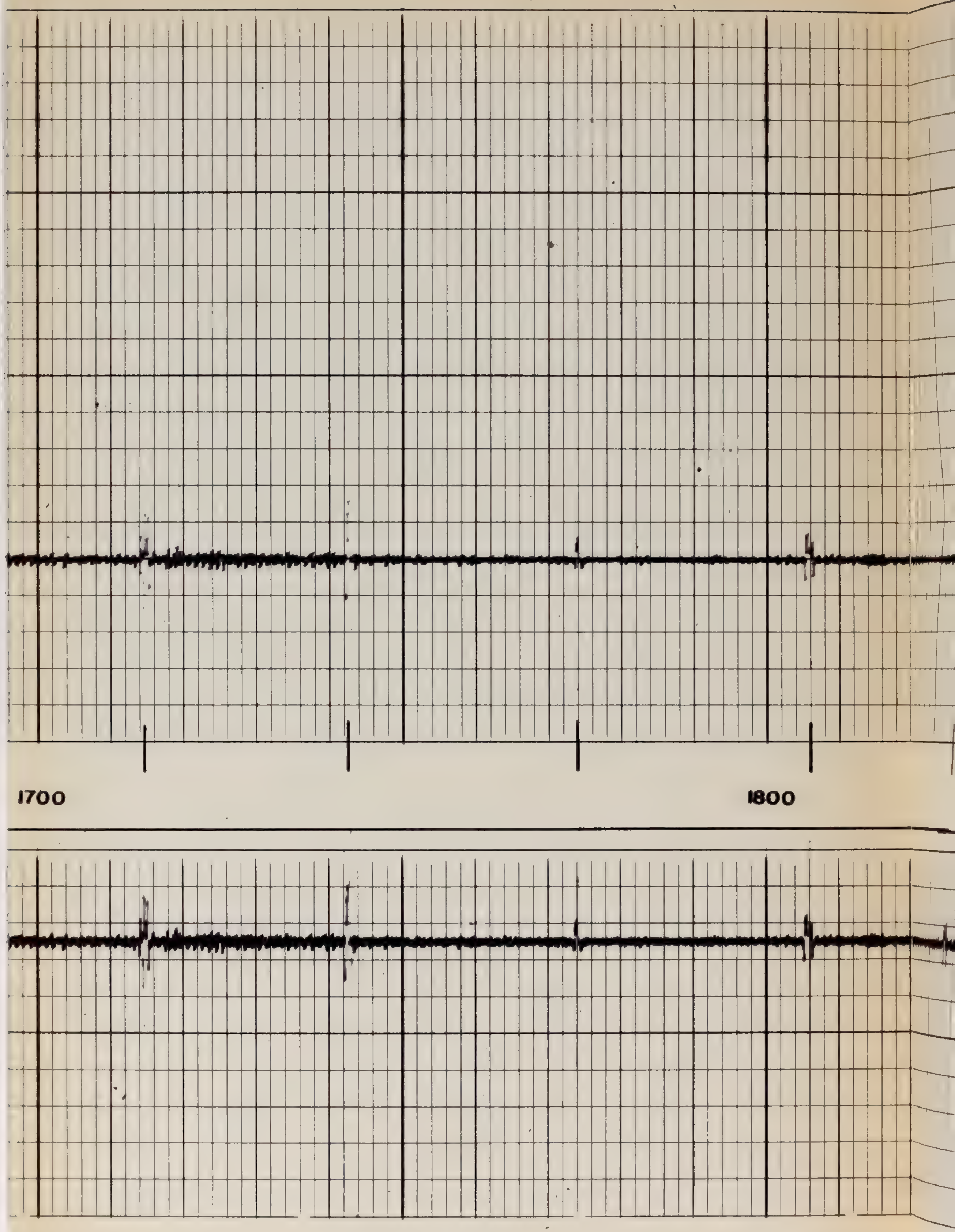
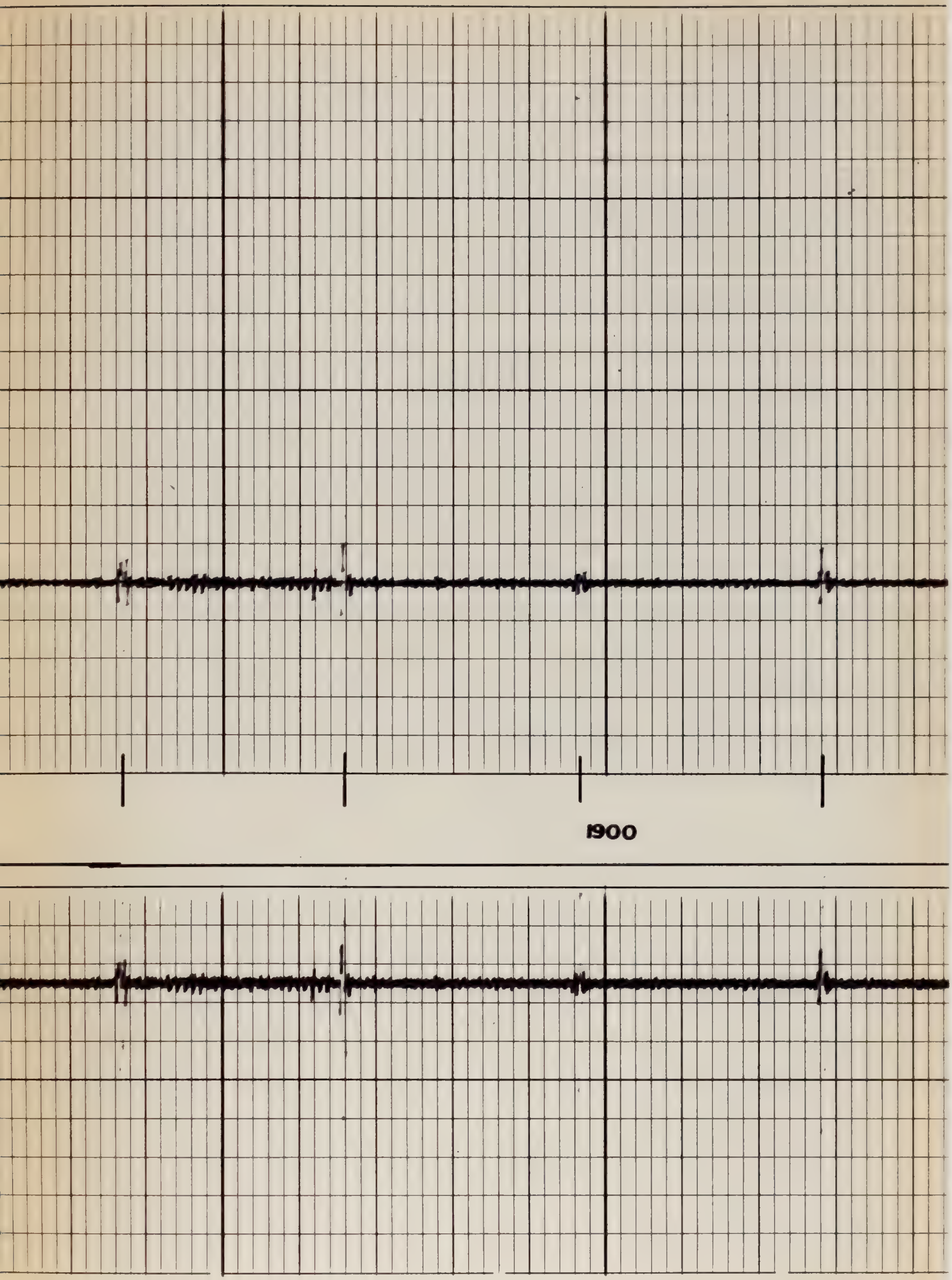

1600
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH
1 11/16" HYPERDOME


1700
1800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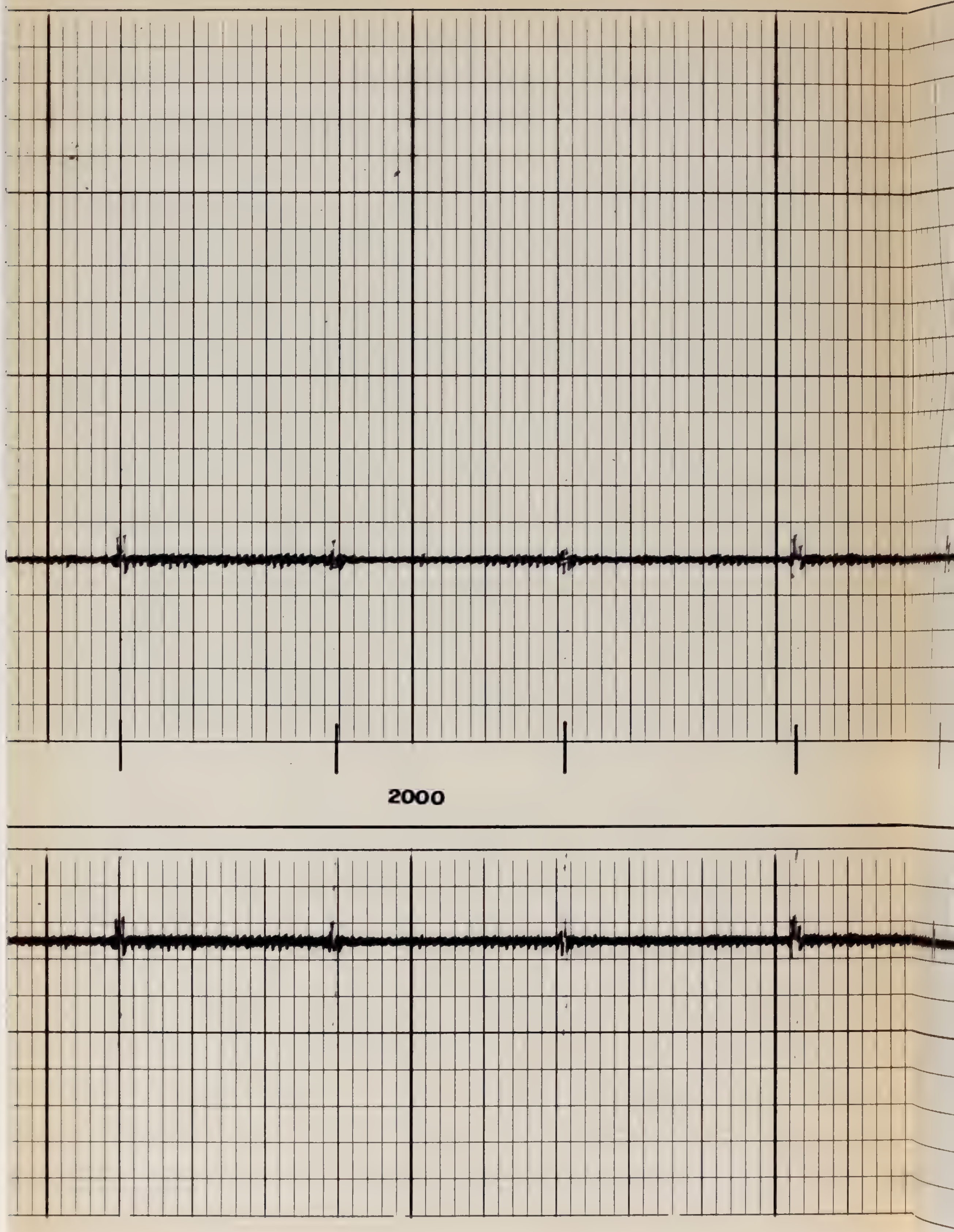
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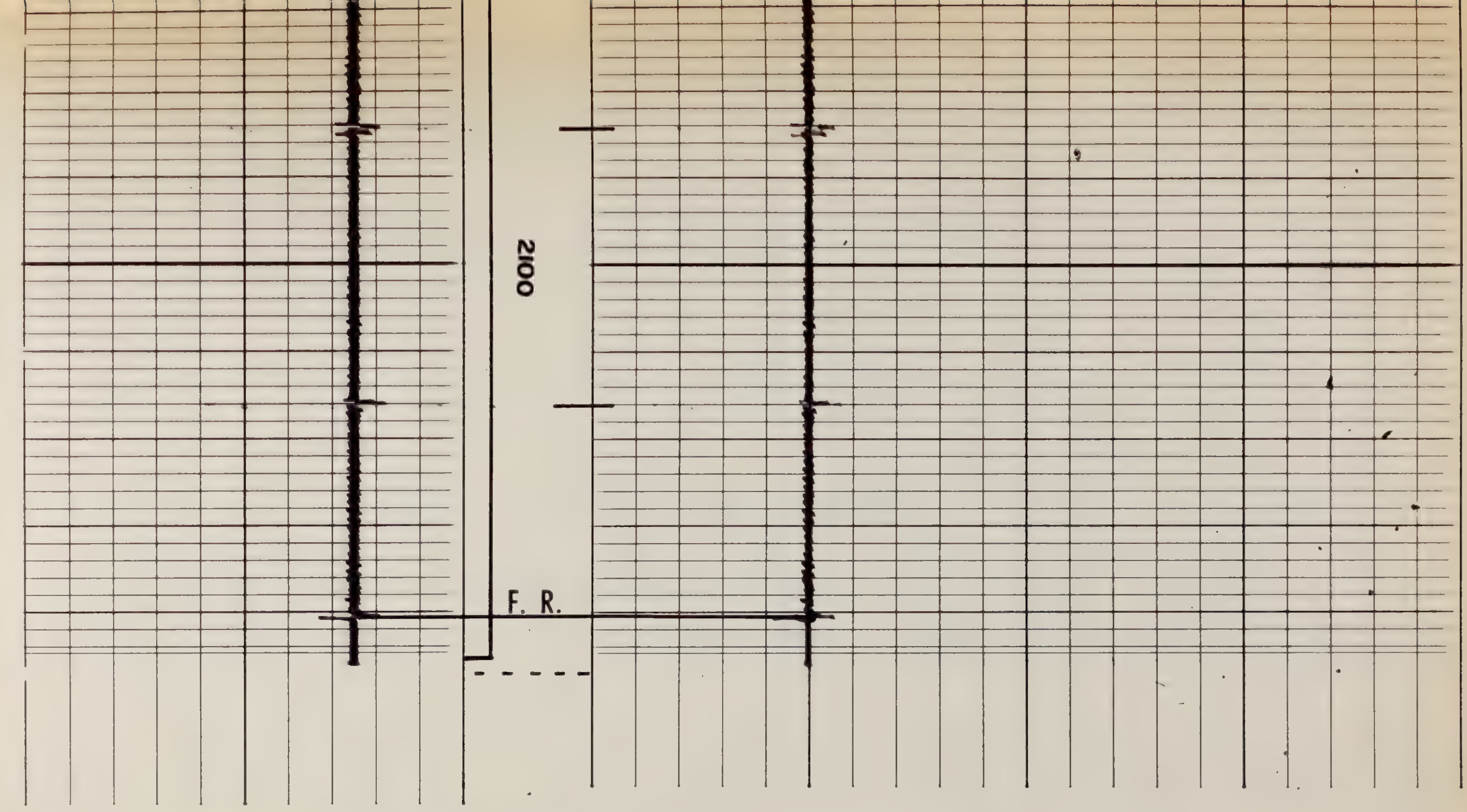
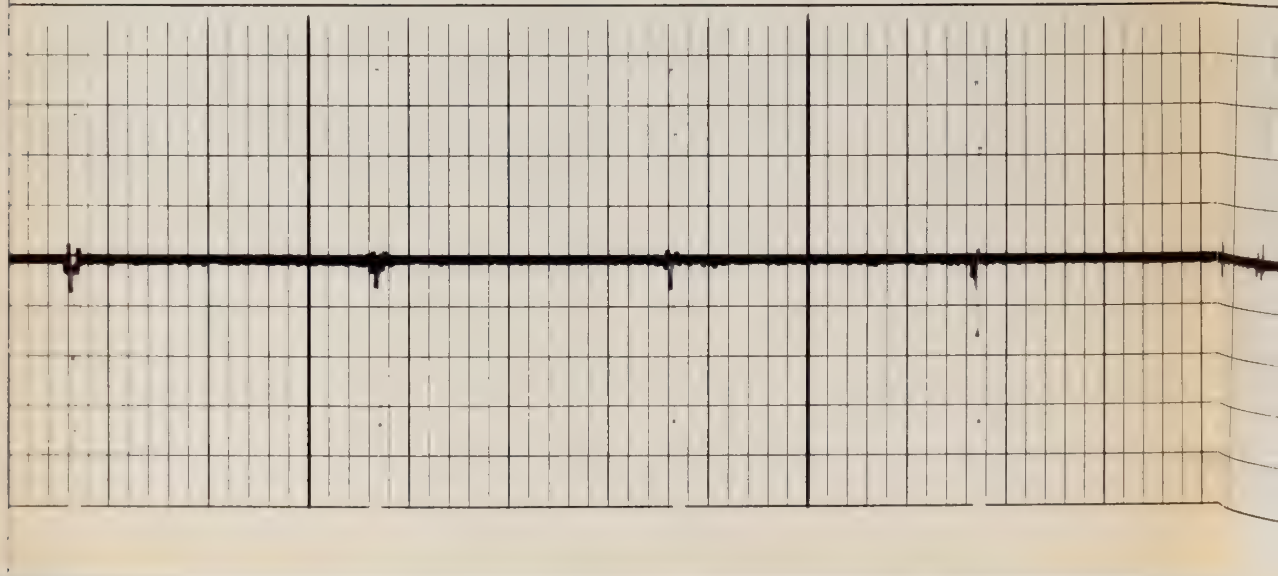
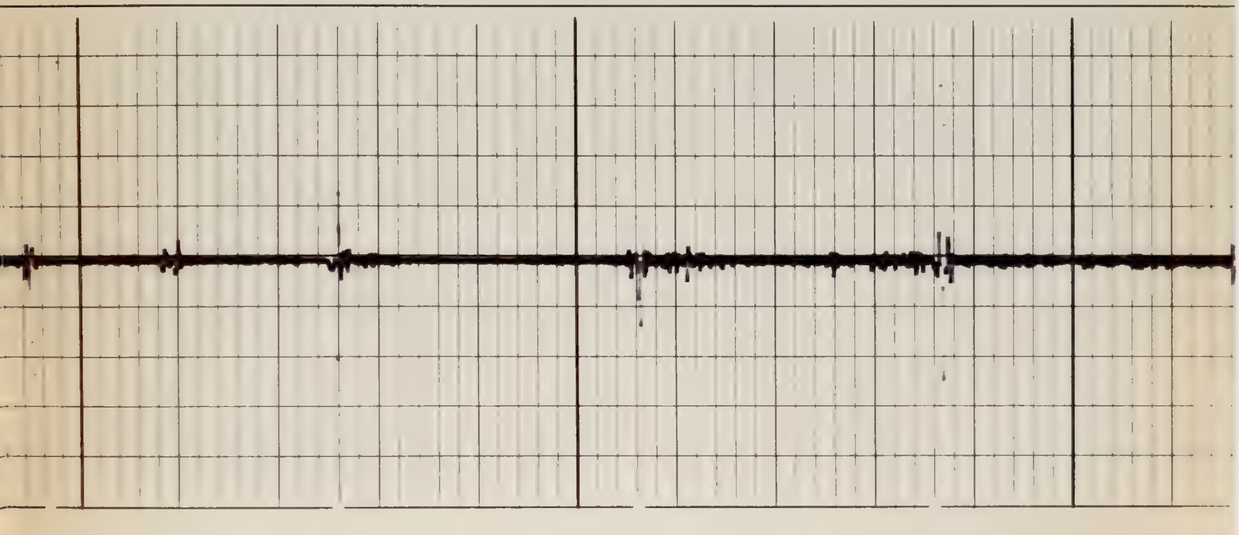


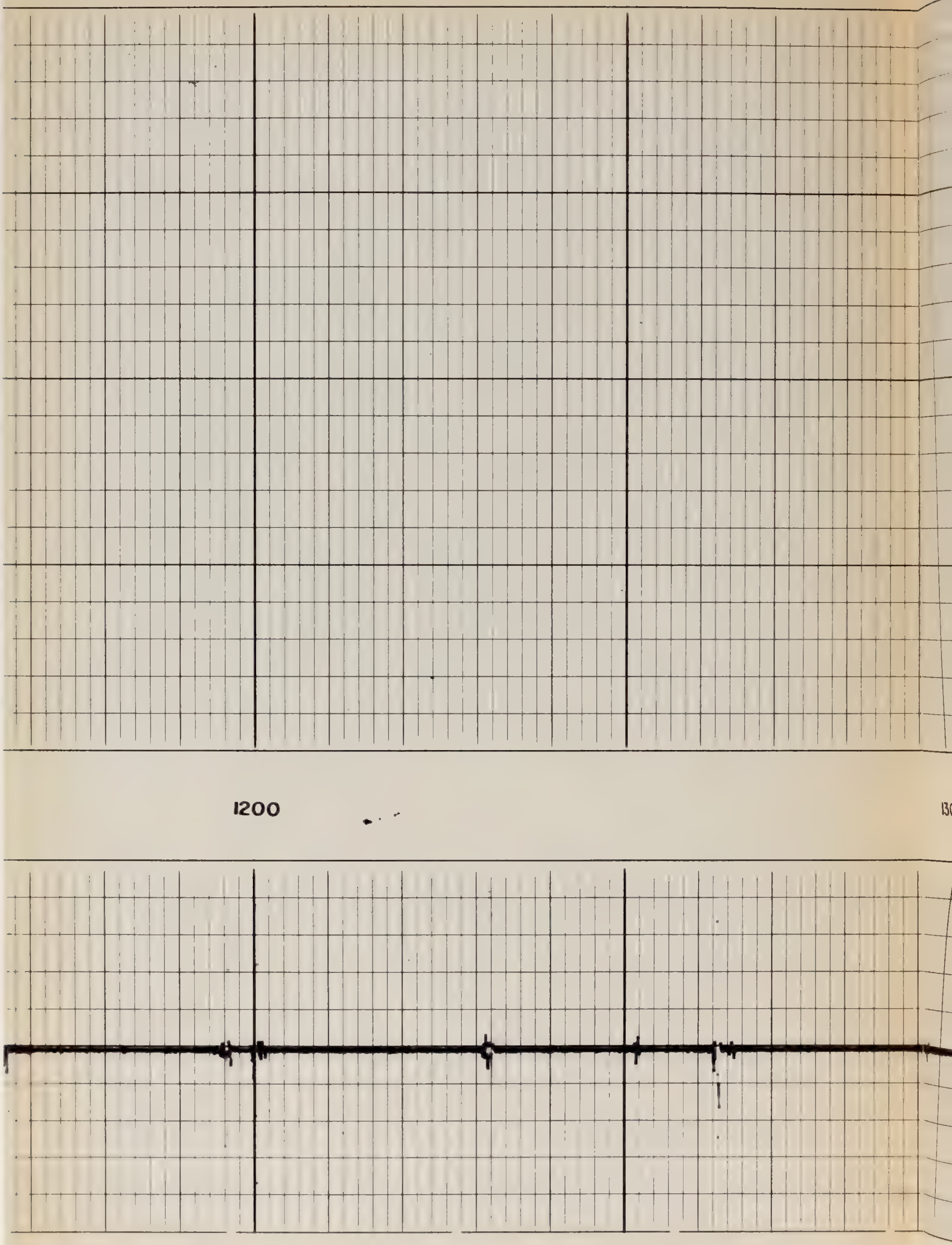
NO.2-MIDDLE STRING-COLLAR LOG RUN BEFORE PERFORATING

1000



1100

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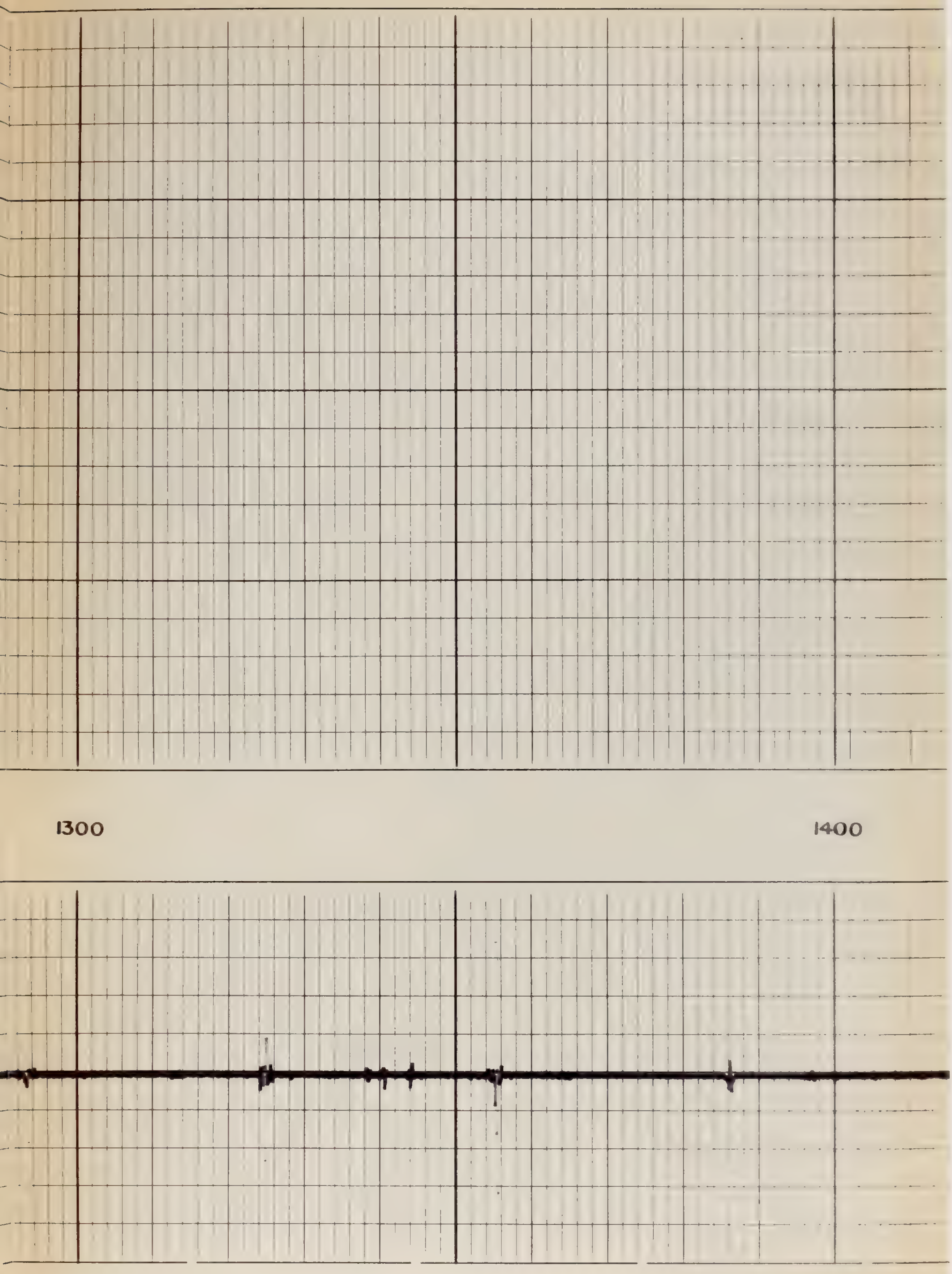
13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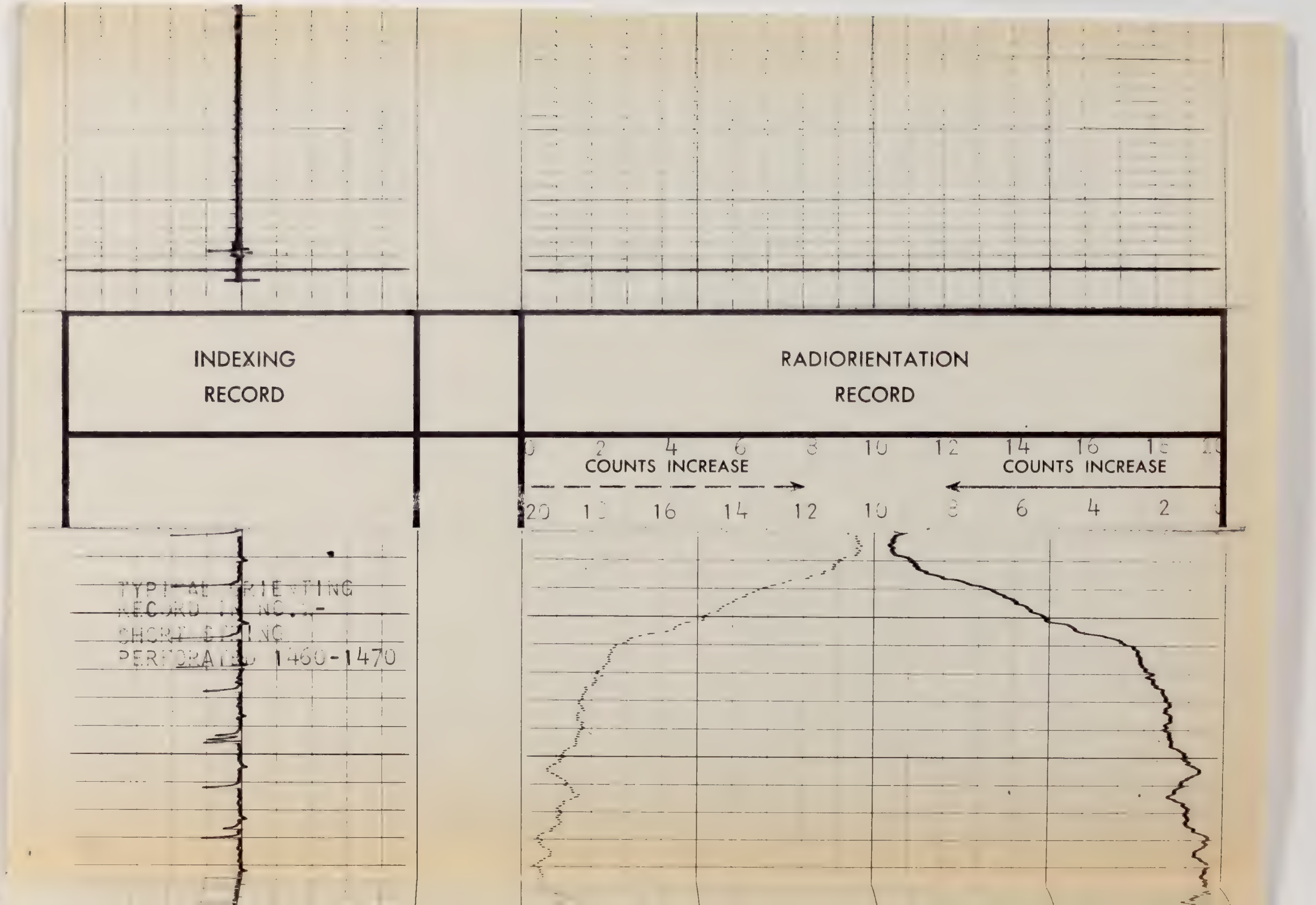
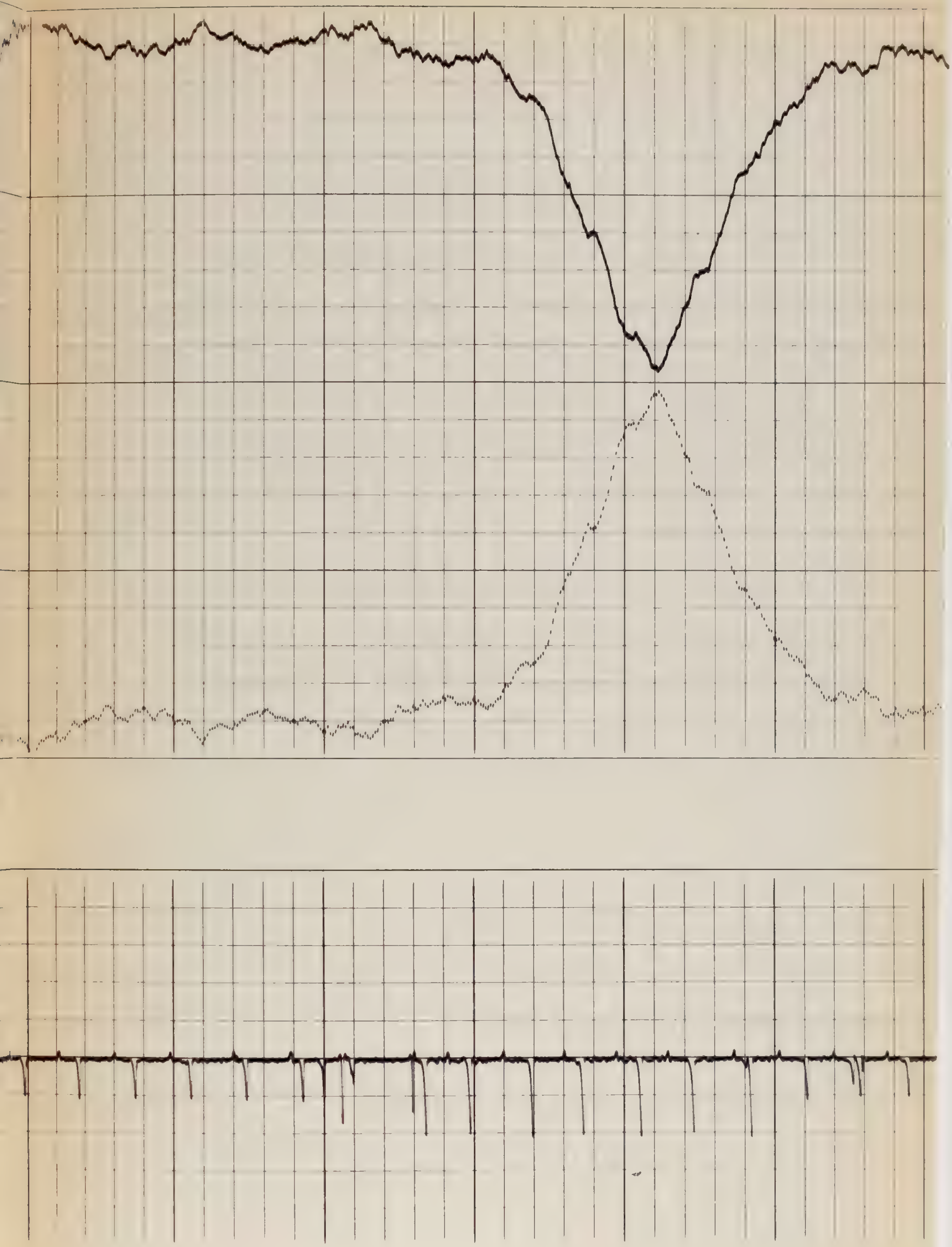
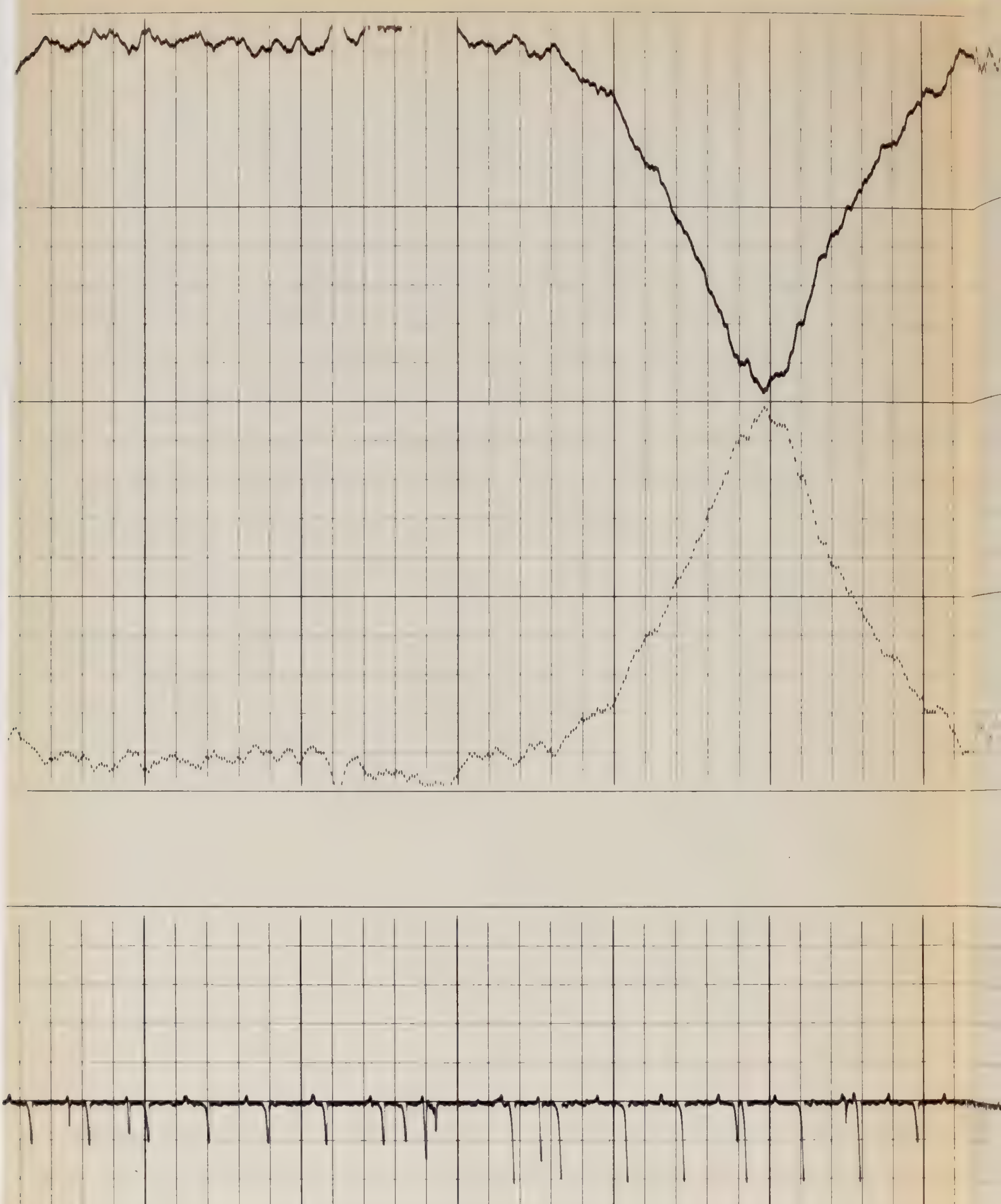
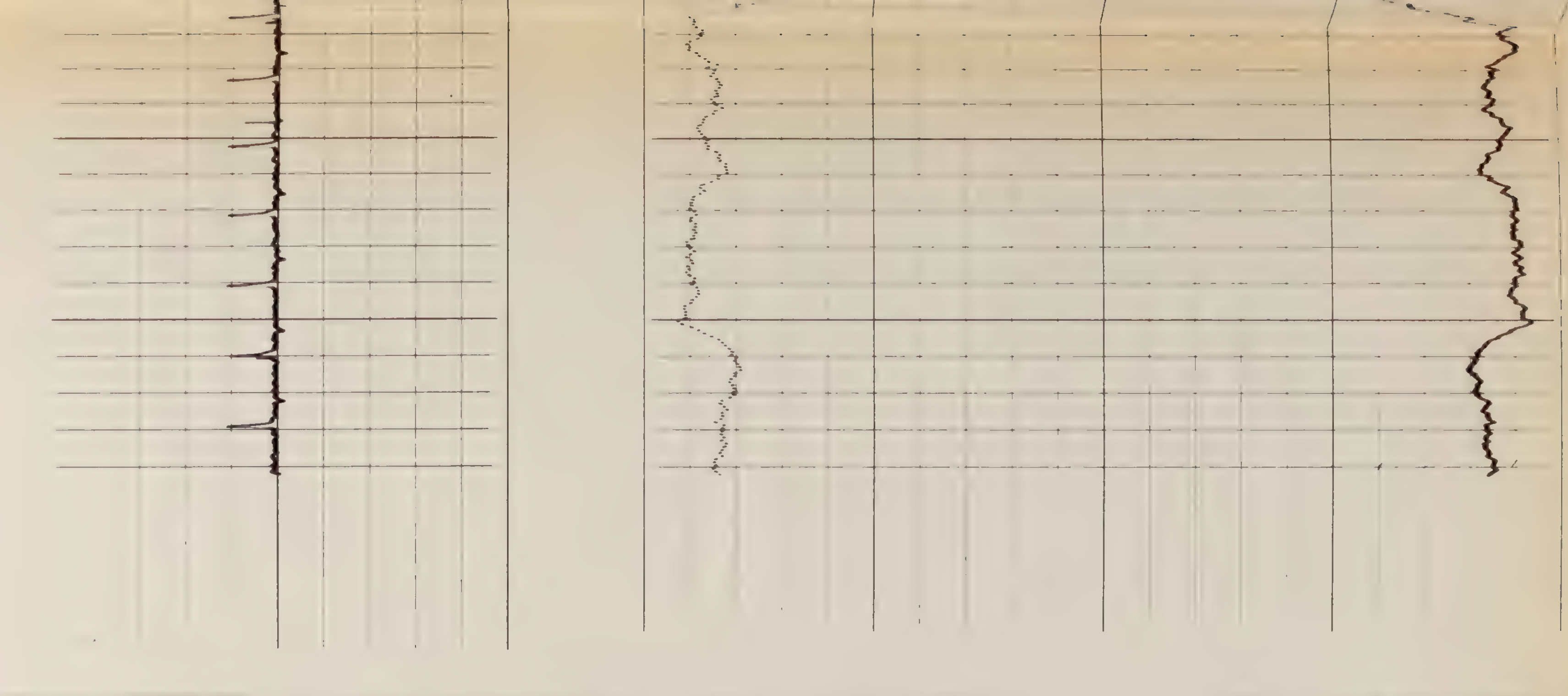
1400


INDEXING
RECORD
RADIORIENTATION
RECORD
0 2 4 6 8 10 12 14 16 18 20
COUNTS INCREASE
COUNTS INCREASE
20 18 16 14 12 10 8 6 4 2 0
TYPICAL ORIENTING
RECORD IN NO. 1-
SHORT STRING
PERFORATED 1460-1470



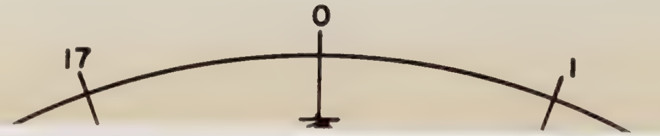


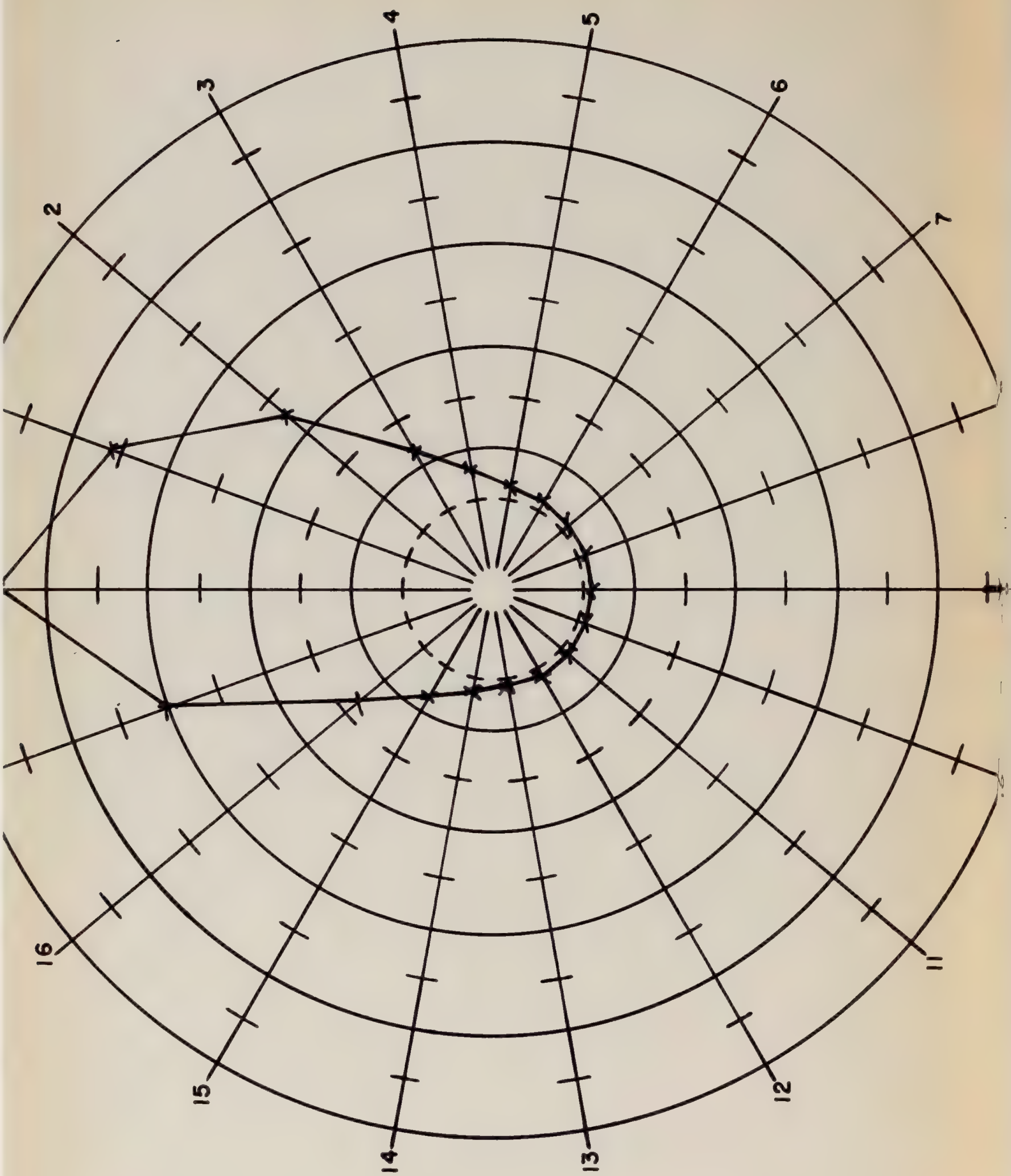


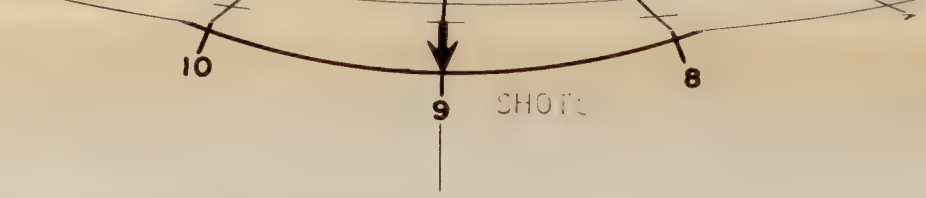
RADIORIENTATION PLOT

POT-B

NO.2-MIDDLE STRING-PERFORATED 1460-1470 ONE SHOT PER FOOT WITH
1 11/16" HYPERDOME




2
3
4
5
6
7
11
12
13
14
15
16



This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by vagrant metal in the drill hole and other conditions unknown to us.

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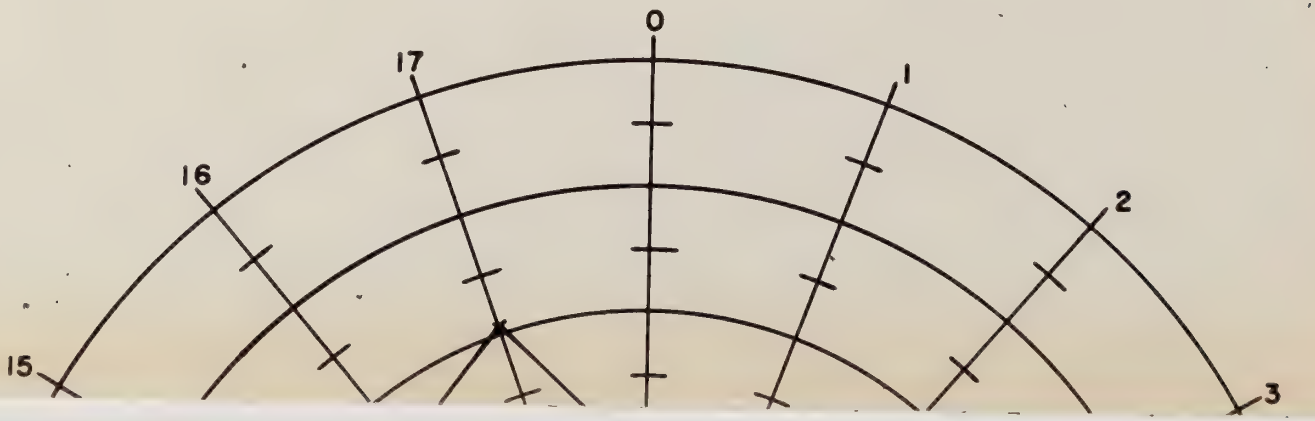
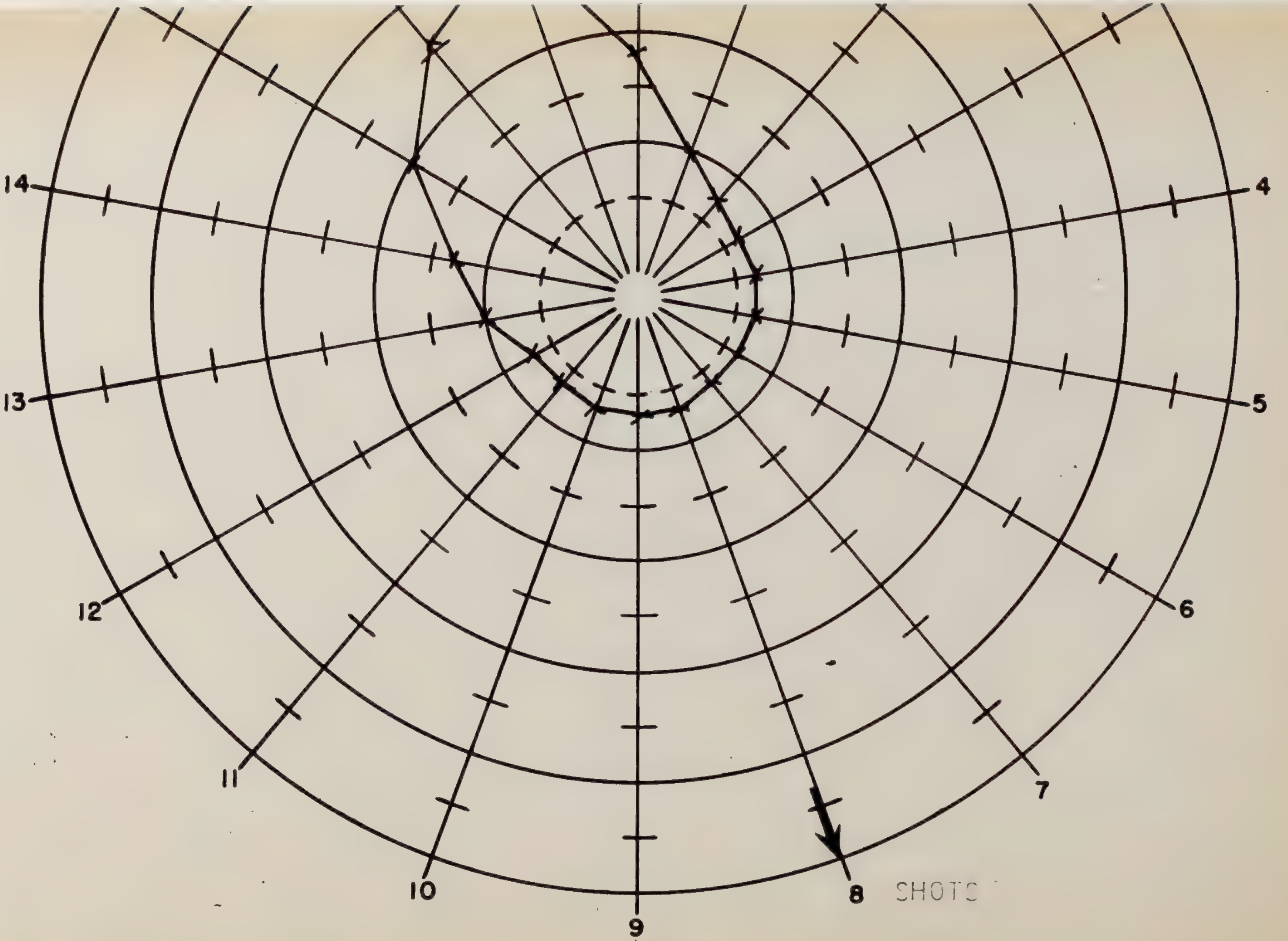
RADIORIENTATION PLOT

POT-B

NO.2-MIDDLE STRING-PERFORATED 1449-1459 ONE SHOT PER FOOT WITH
1 11/16" HYPERDOME





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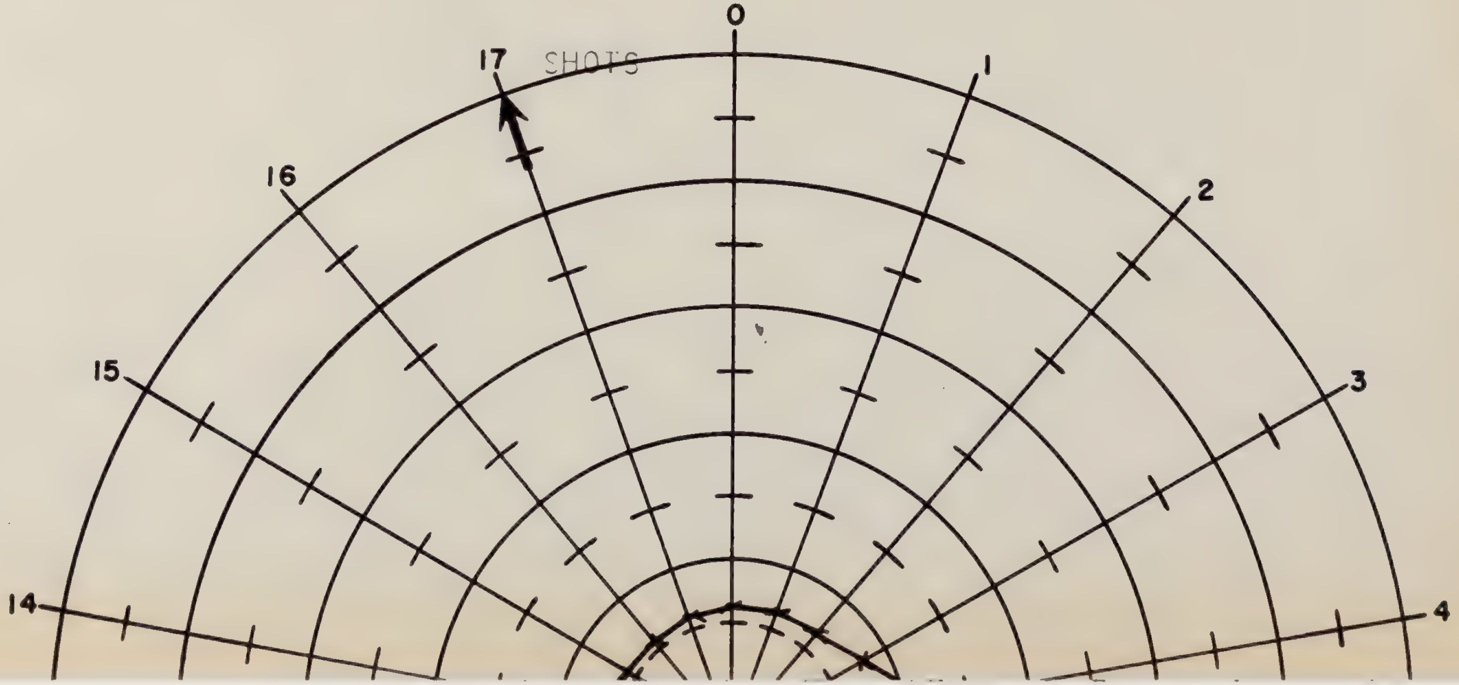
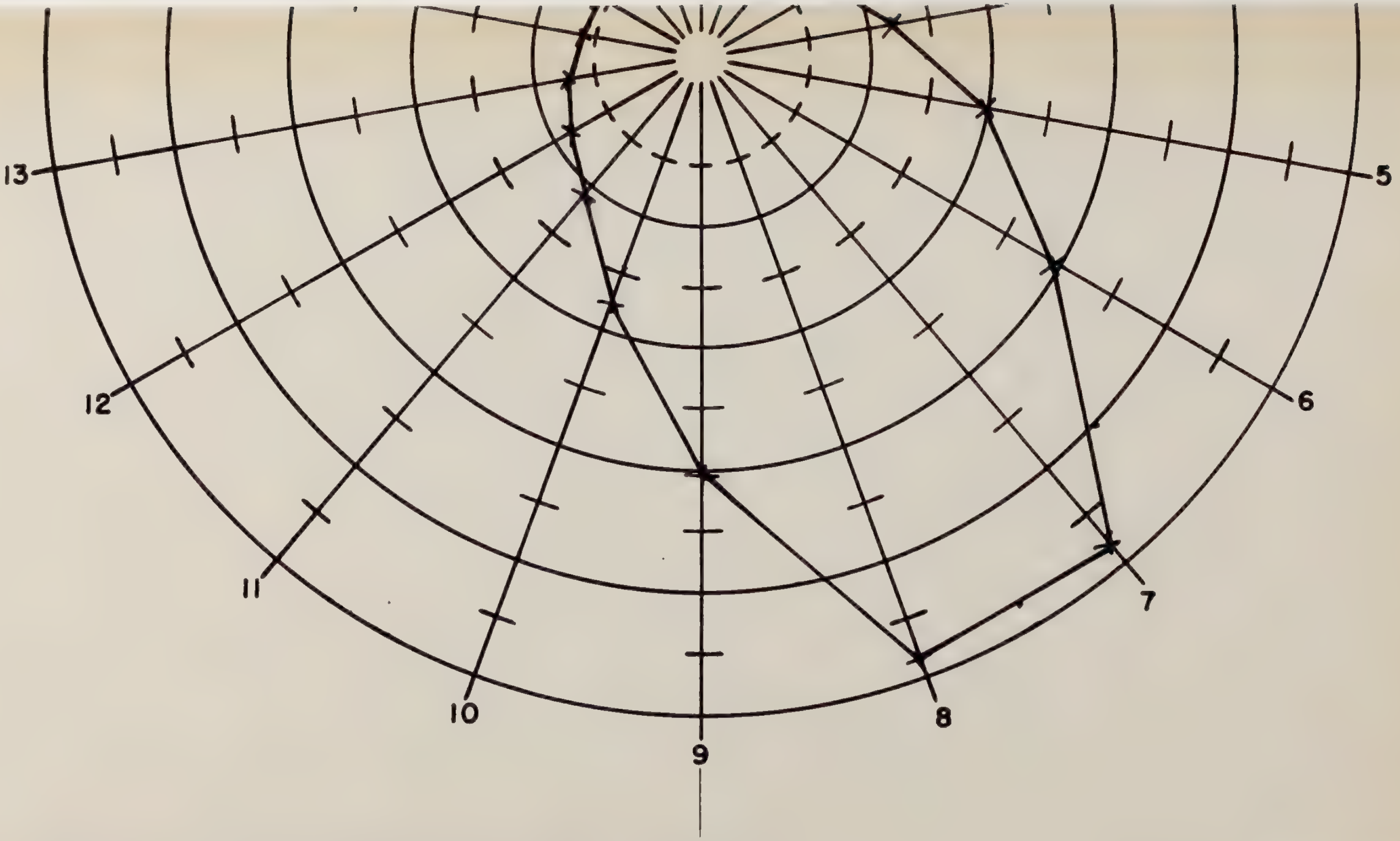
drill hole and other conditions unknown to us.

RADIORIENTATION PLOT

POT-B

NO.2-MIDDLE STRING-PERFORATED 1438-1443 ONE SHOT PER FOOT WITH
1 11/16" HYPERDOME





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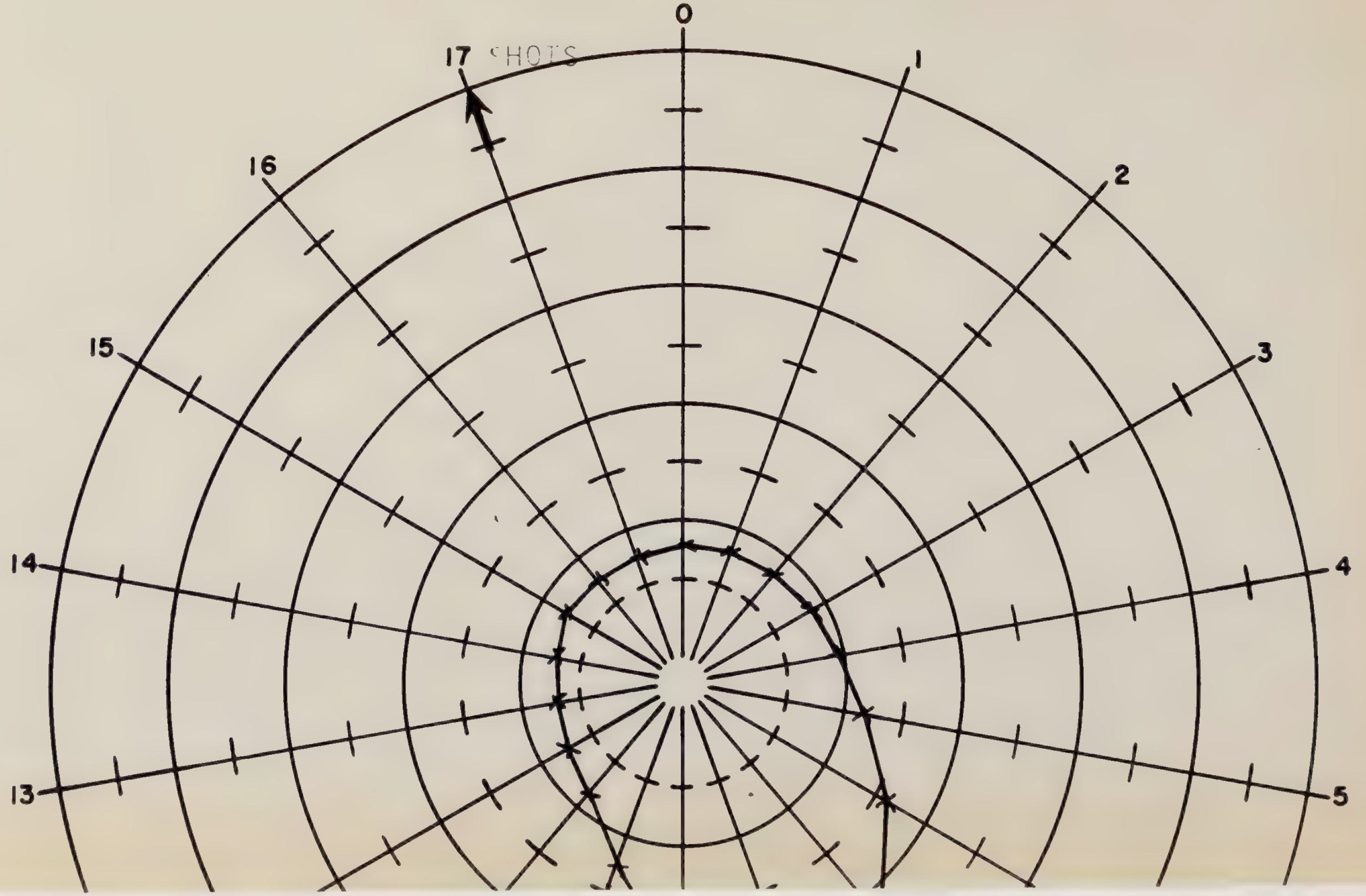
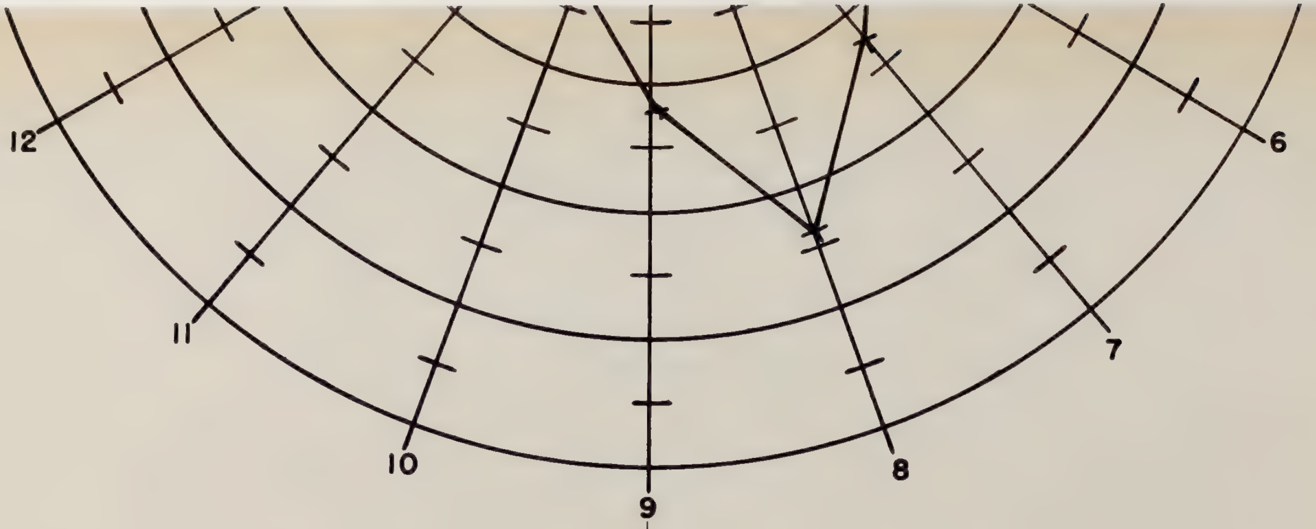
RADIORIENTATION PLOT

POT-B

NO.2-MIDDLE STRING-PERFORATED 1430-1437 ONE SHOT PER FOOT WITH
1 11/16" HYPERDOME





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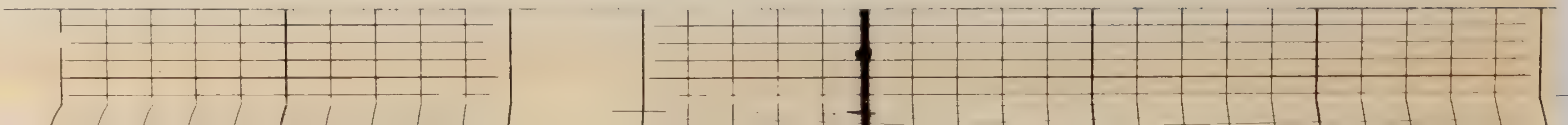
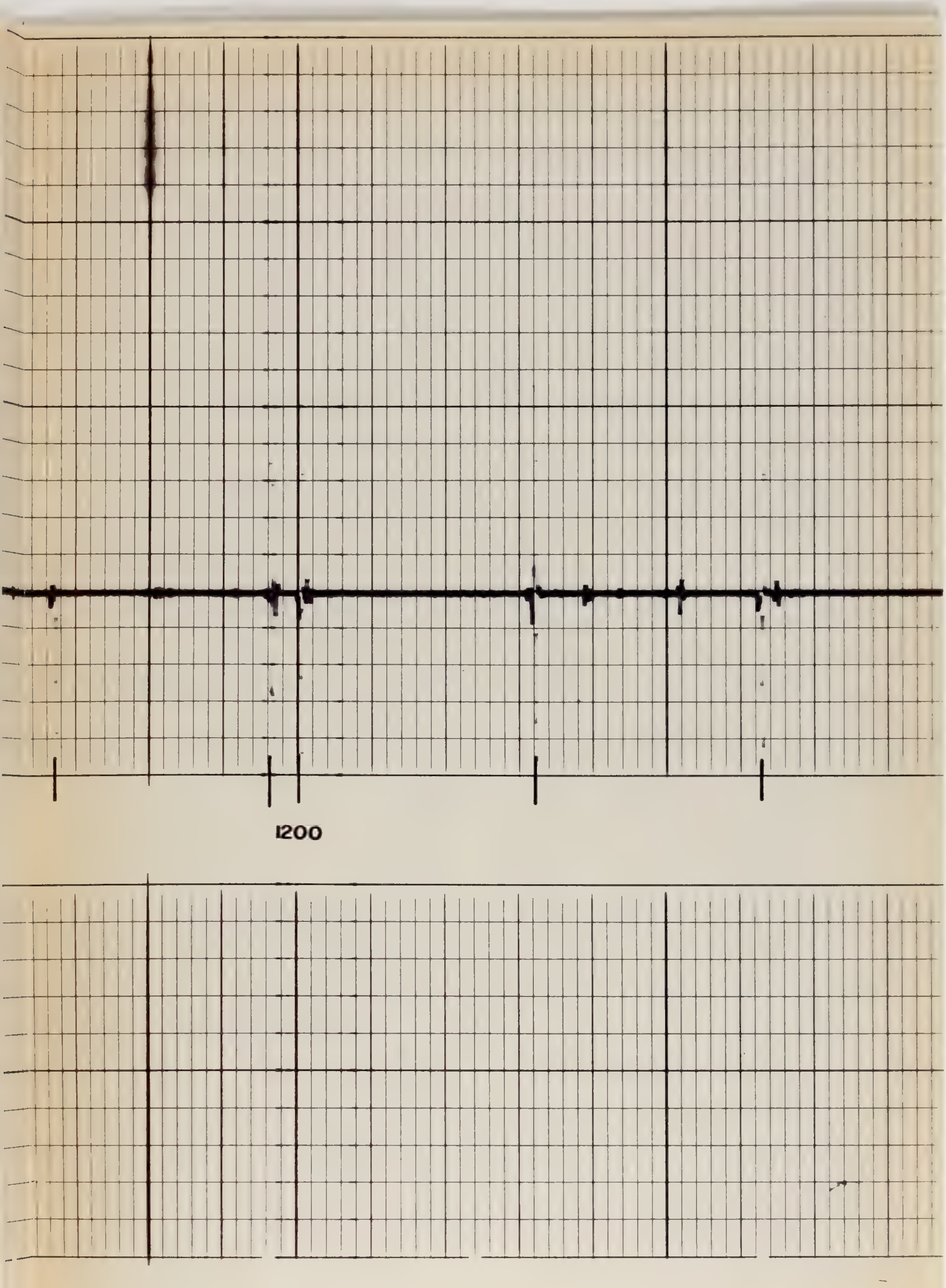
NO. [illegible]-MIDDLE STRING-COLLAR LOG RUN AFTER PERFORATING

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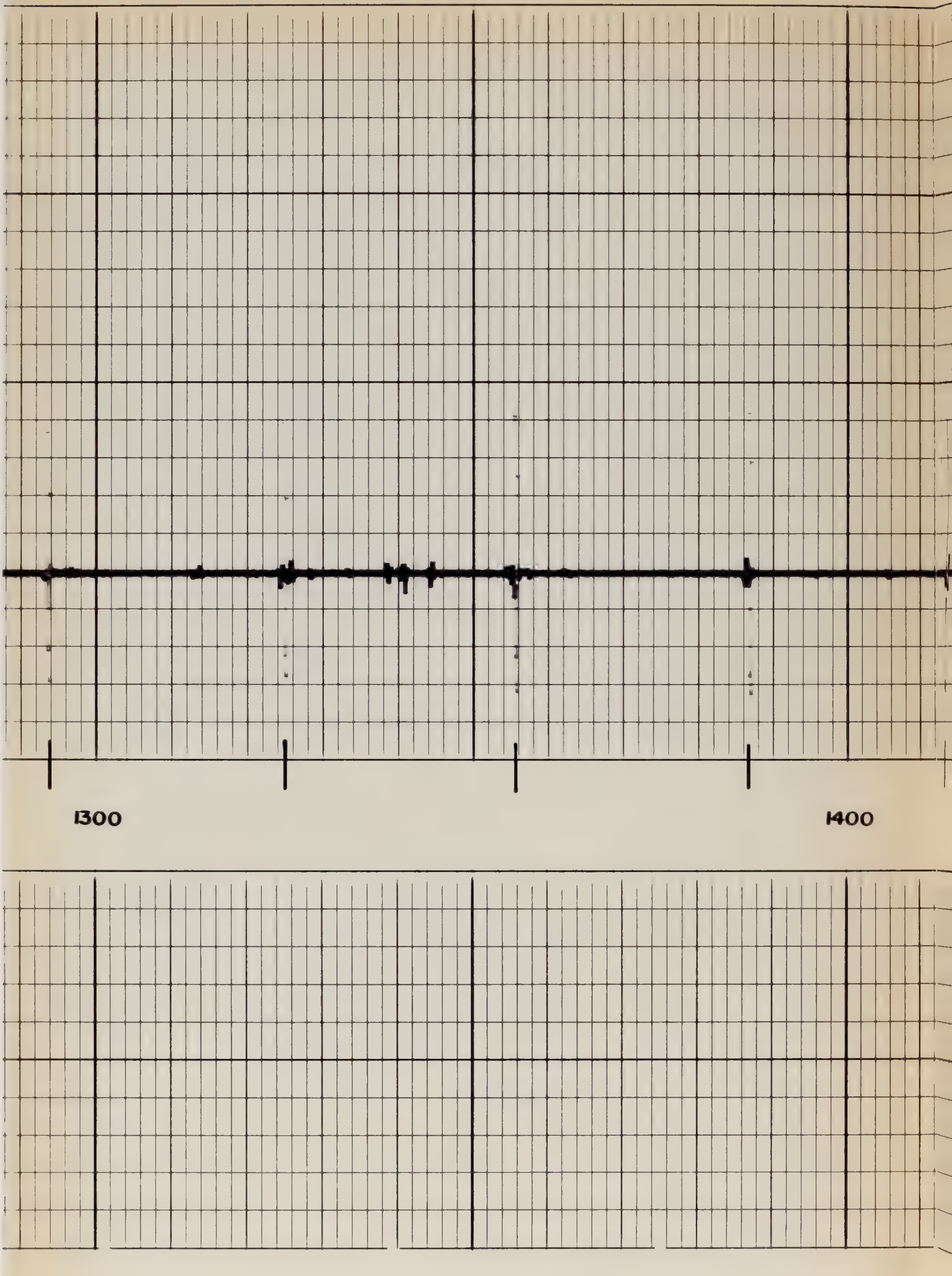
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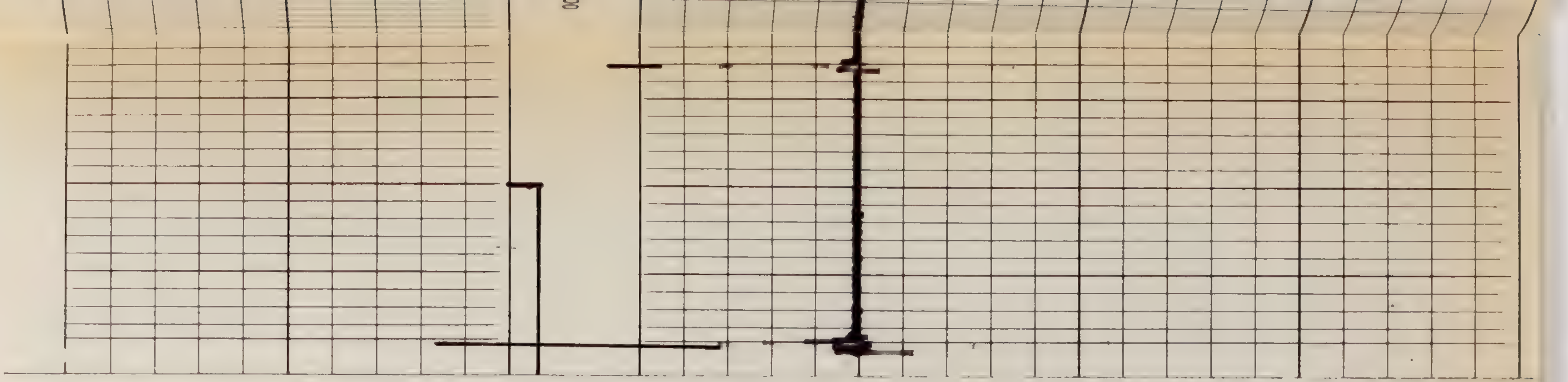
1400



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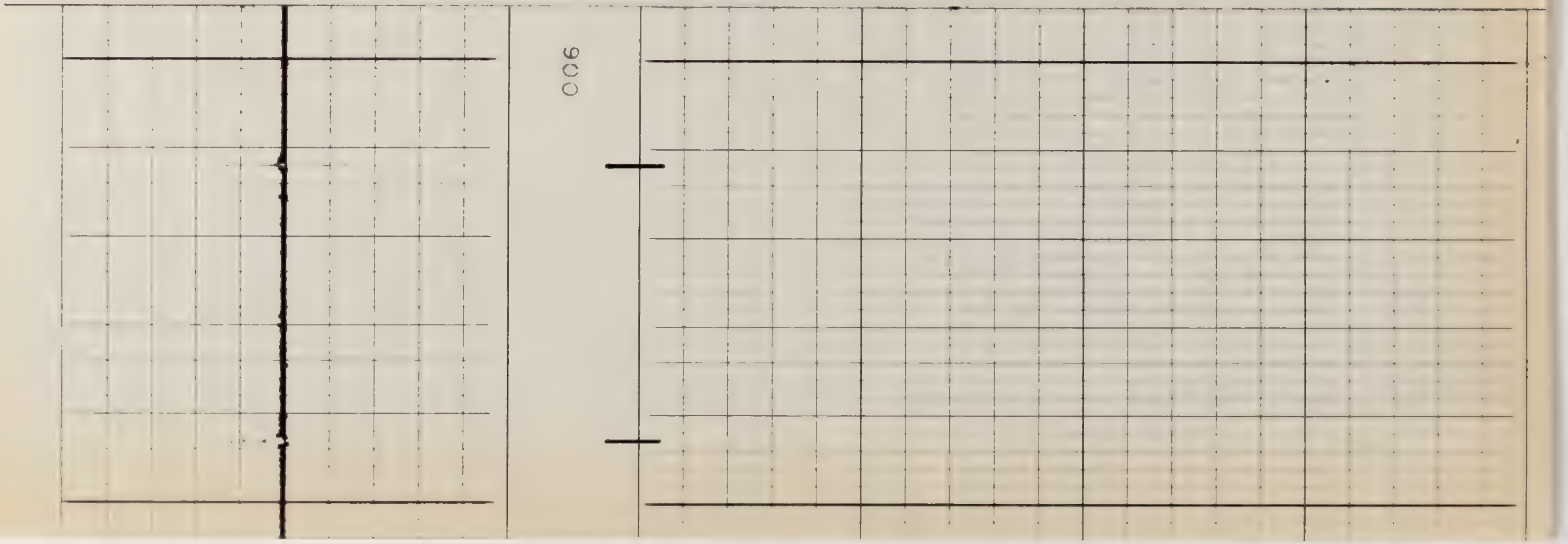
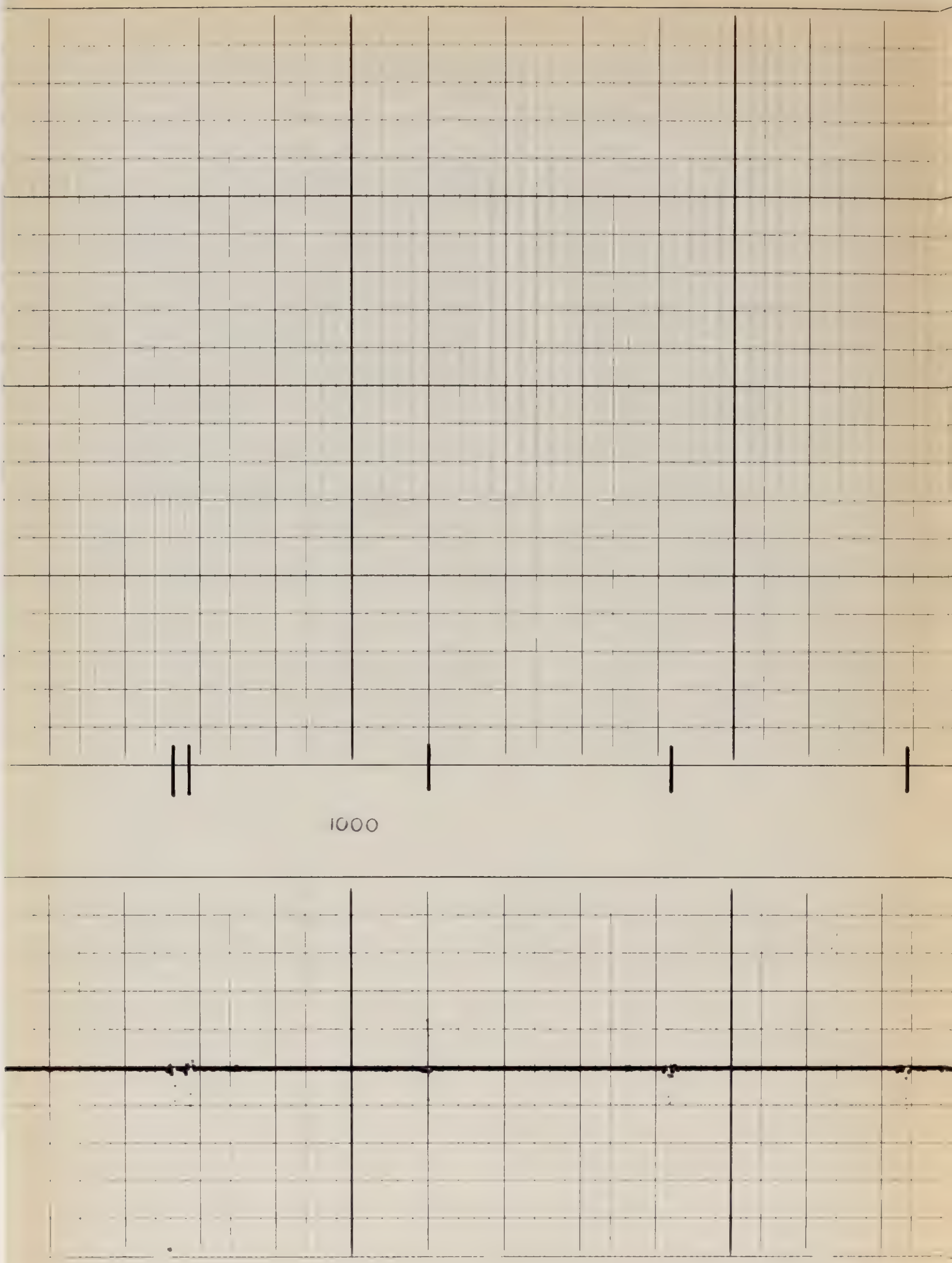
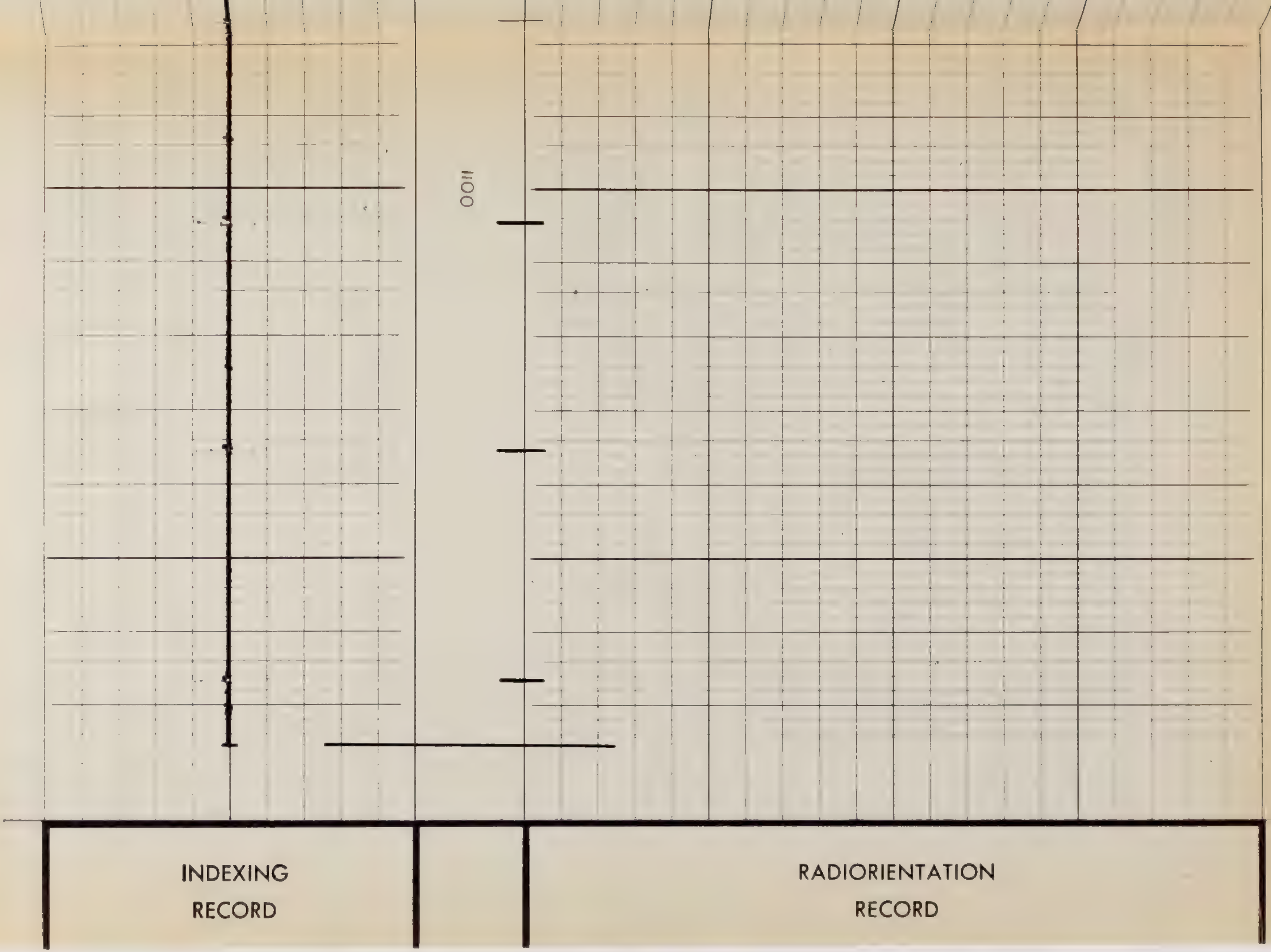
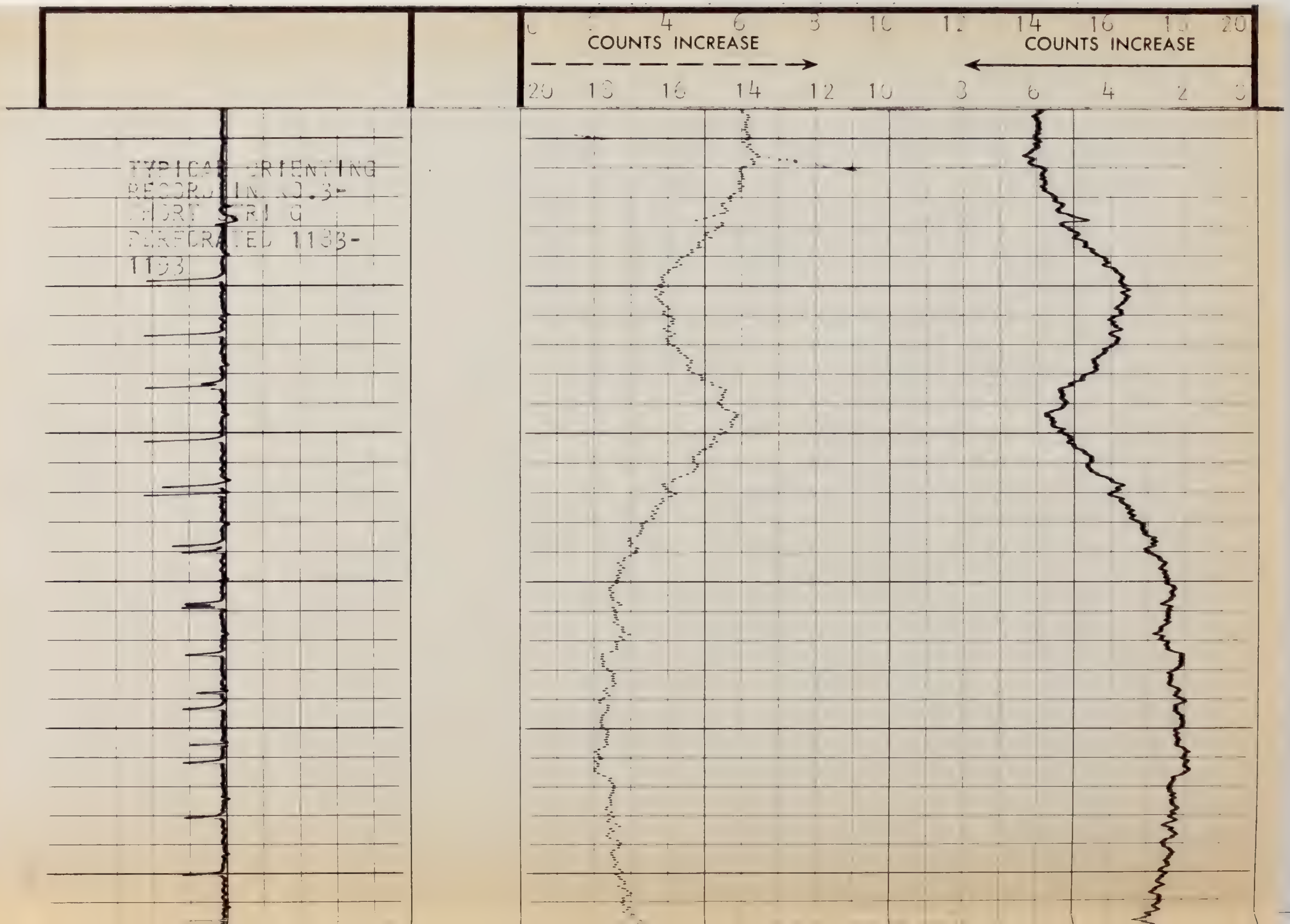
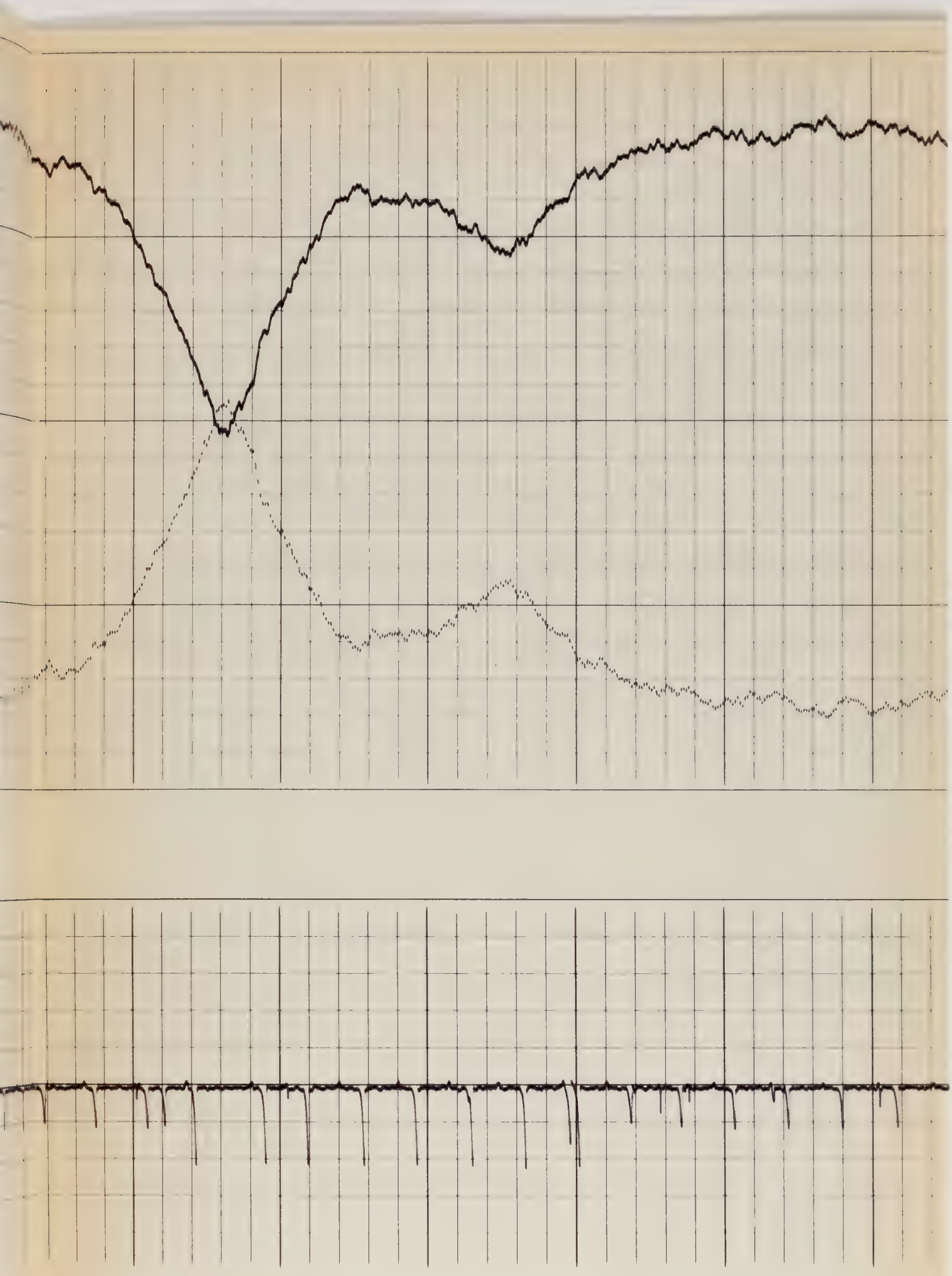
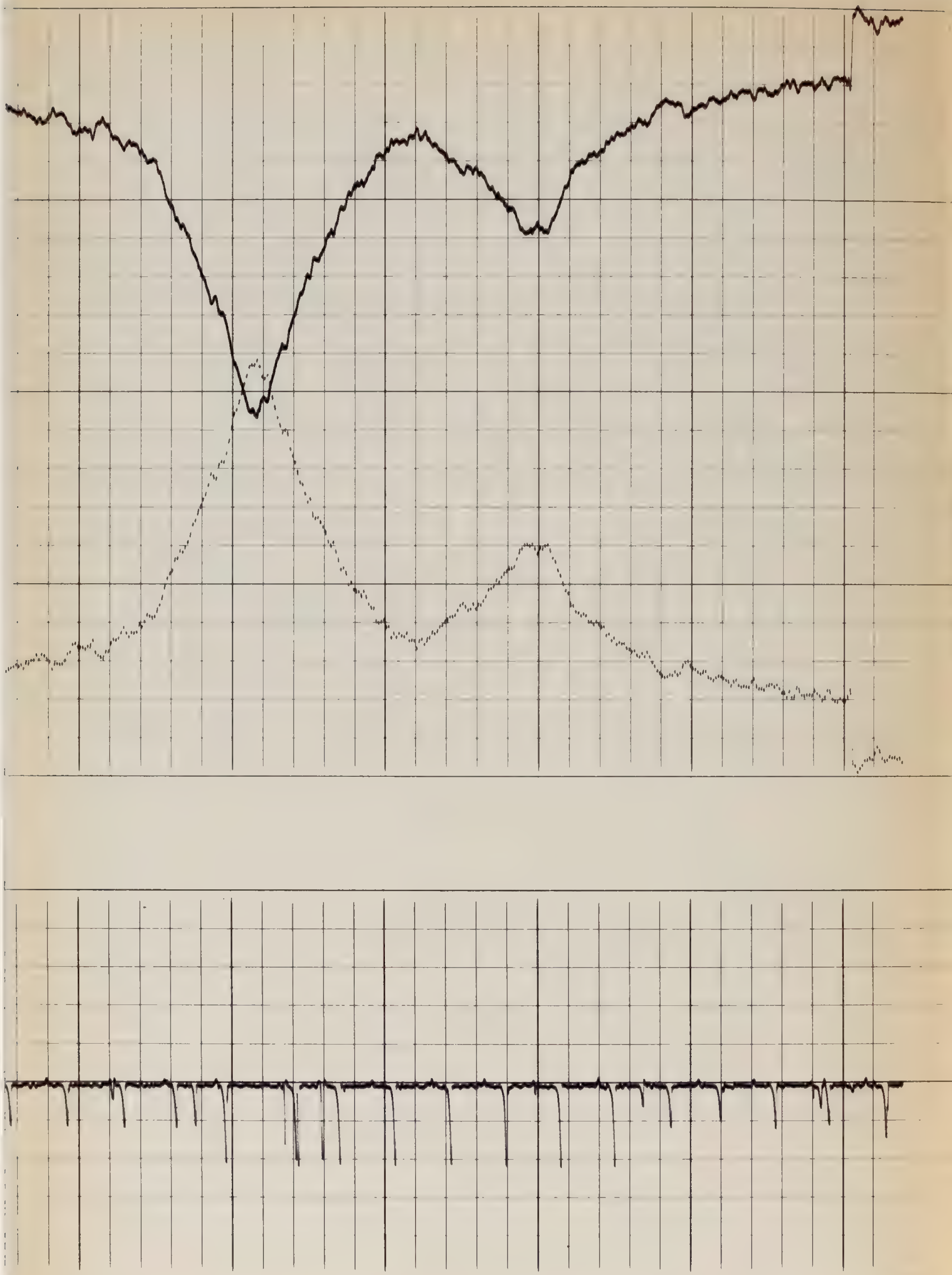



1000


1100
INDEXING RECORD
RADIORIENTATION RECORD


0 2 4 6 8 10 12 14 16 18 20
COUNTS INCREASE
COUNTS INCREASE
20 18 16 14 12 10 8 6 4 2 0
TYPICAL ORIENTING
RECORD IN NO.3-
SHORT STRING
PERFORATED 1138-
1193

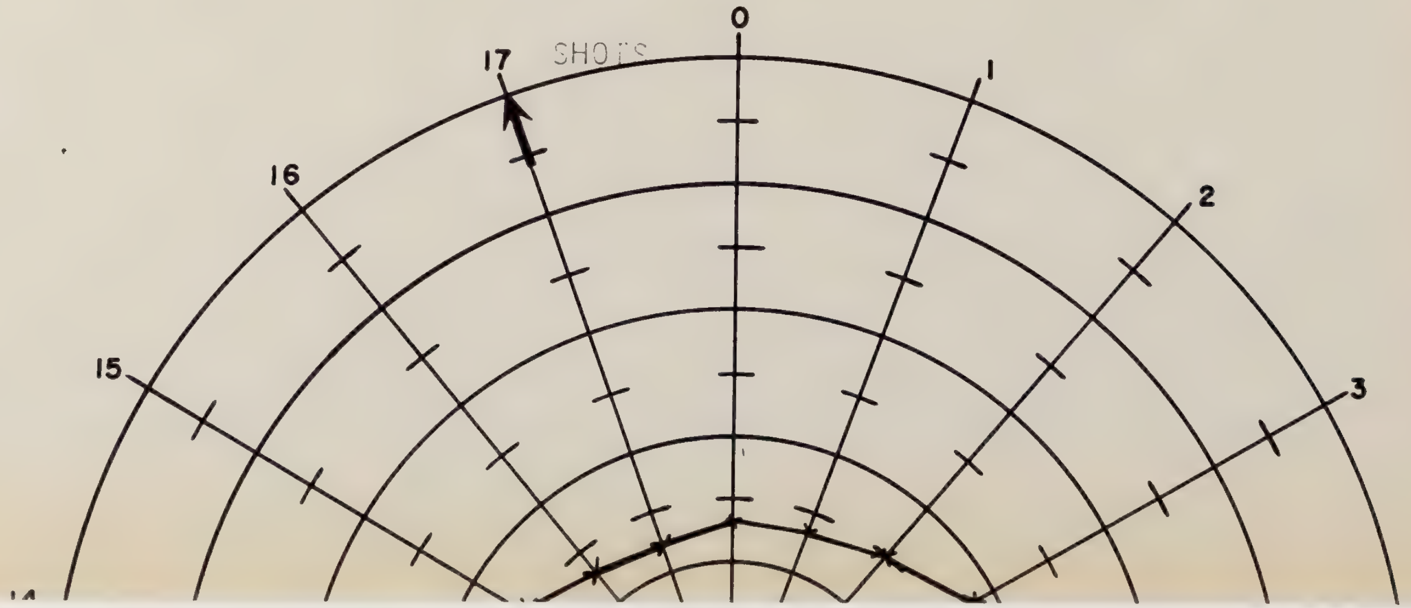


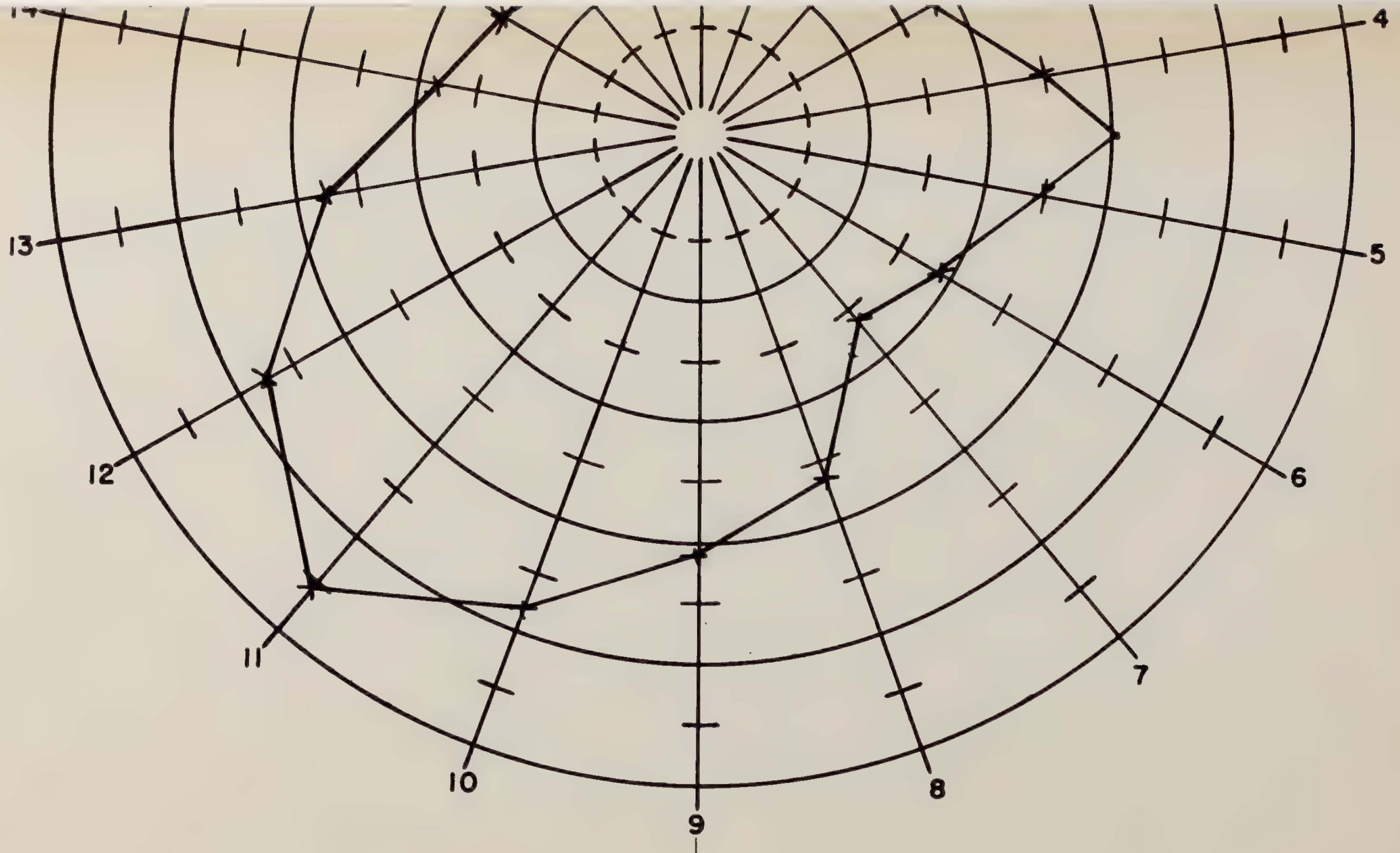


RADIORIENTATION PLOT

POT-B

NO.3-SHORT STRING-PERFORATED 1183-1193 ONE SHOT PER FOOT WITH
1 11/16" HYPERDOME





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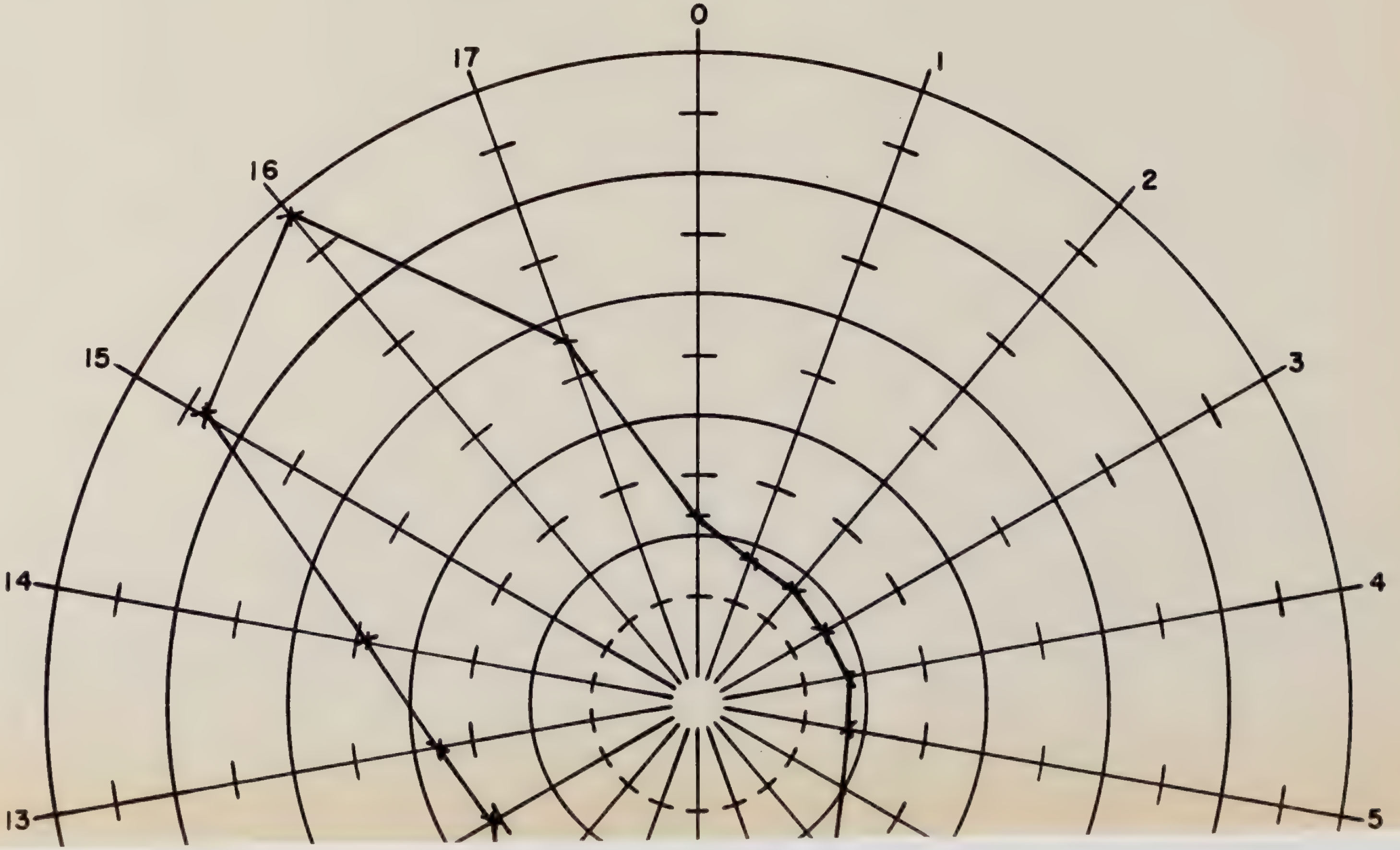
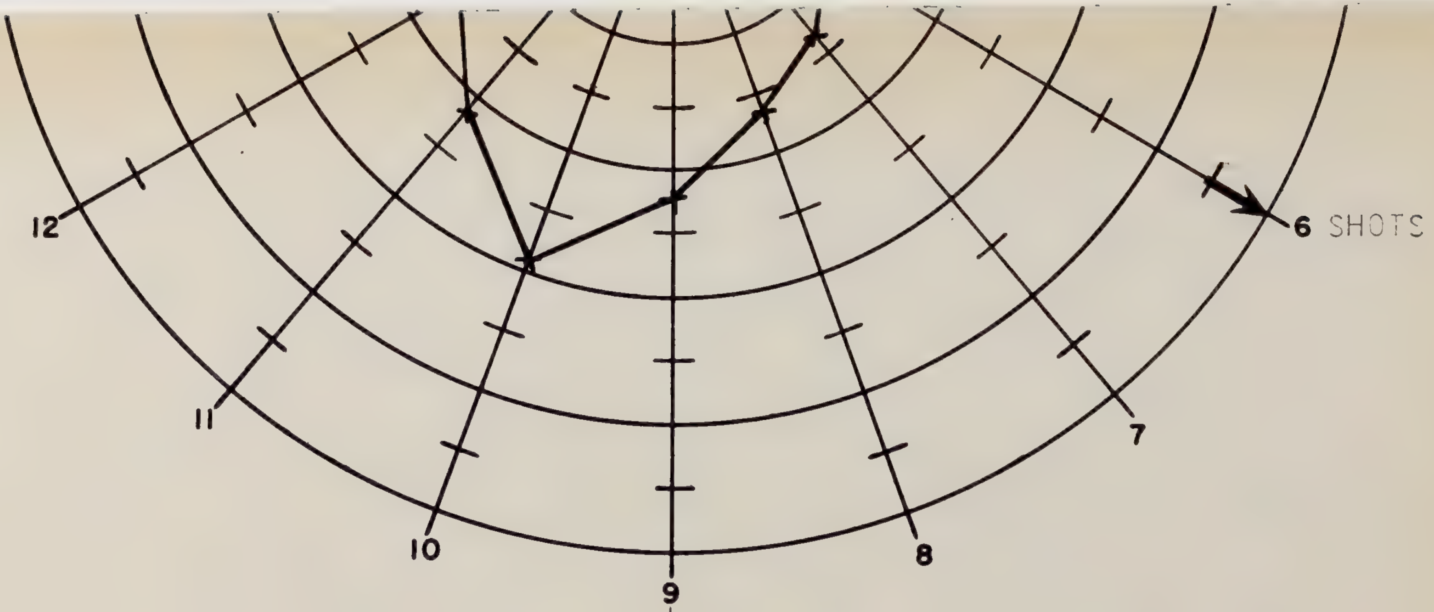
RADIORIENTATION PLOT

POT-B

NO.3-SHORT STRING-PERFORATED 1172-1182 ONE SHOT PER FOOT WITH
1 11/16" HYPERDOME





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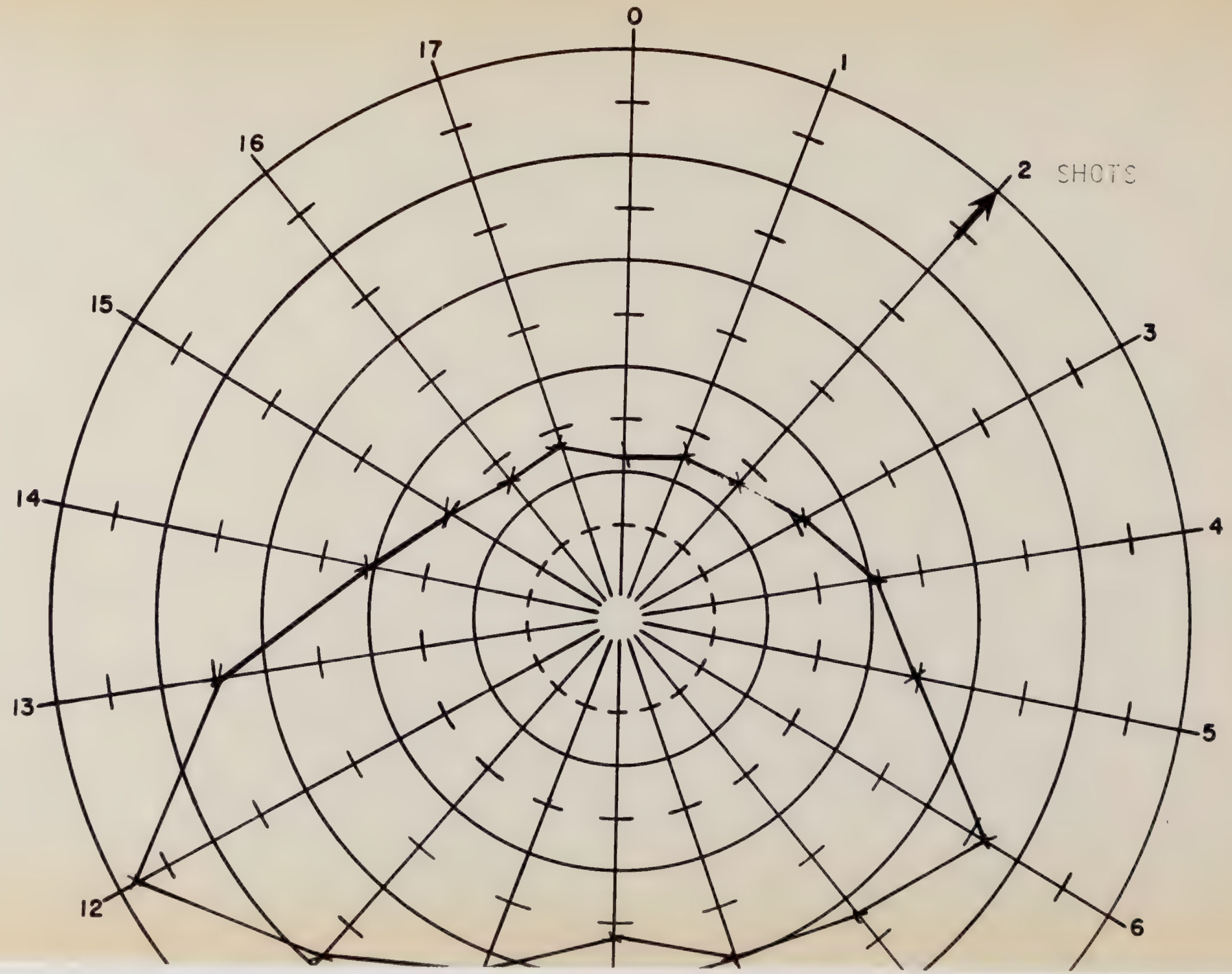
RADIORIENTATION PLOT

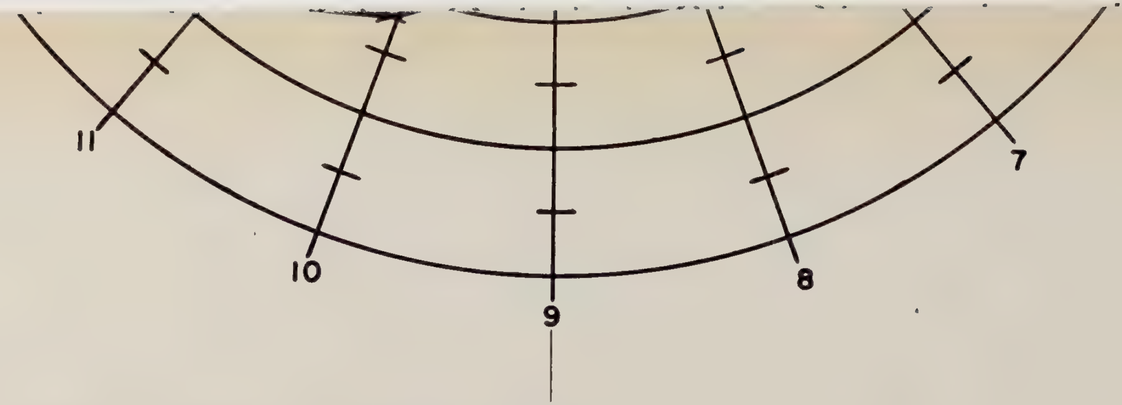
POT-B

RADIORIENTATION PLOT

POT-B

NO.3-SHORT STRING-PERFORATED 1161-11,1 ONE SHOT PER FOOT WITH
1 11/16" HYPERDOME





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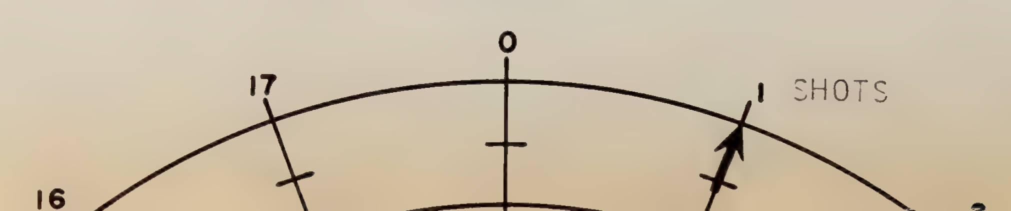
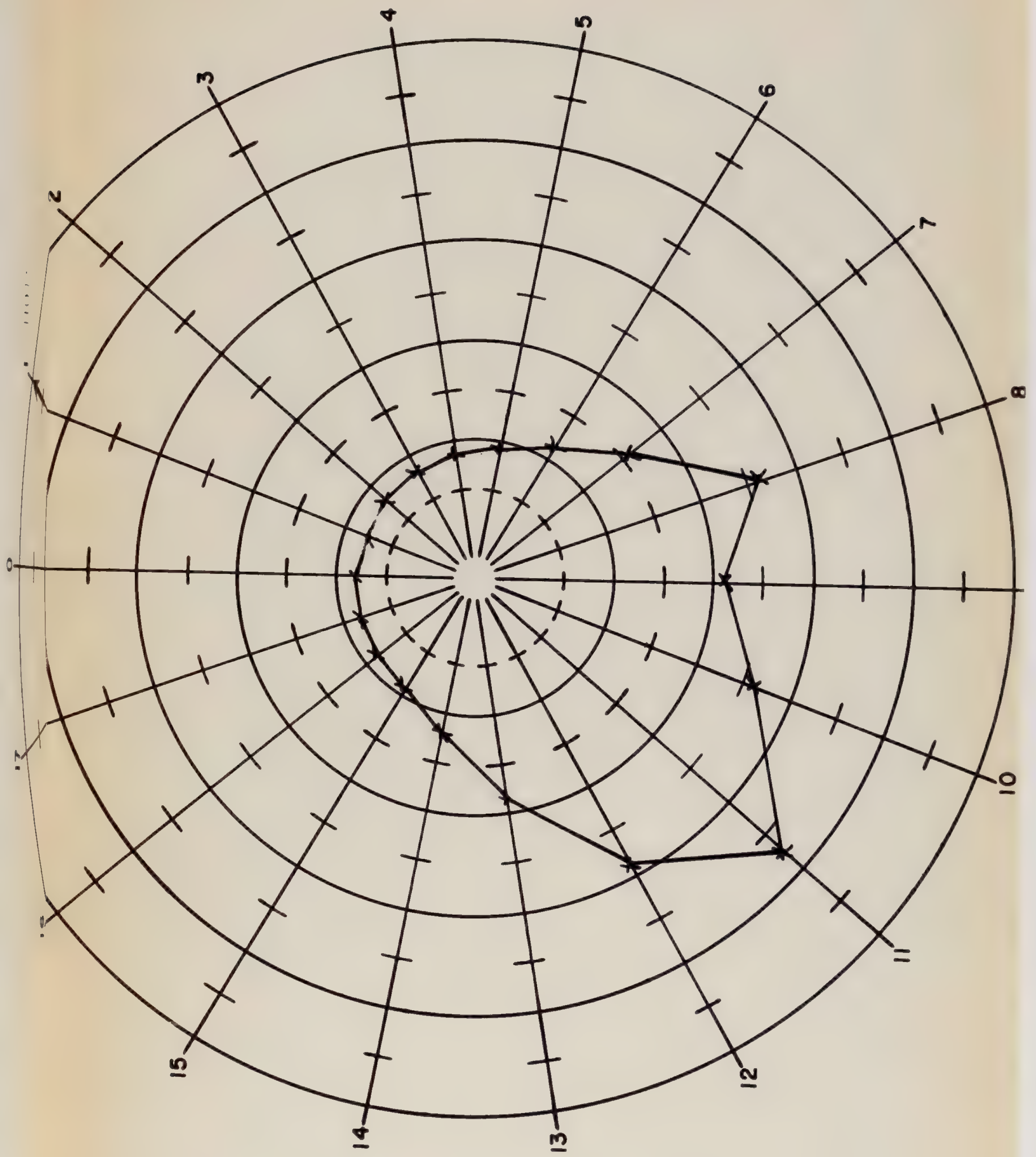
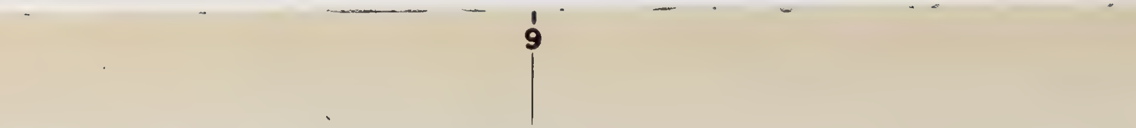
RADIORIENTATION PLOT

POT-B

NO.3-SHORT STRING-PERFORATED 1150-1160 ONE SHOT PER FOOT WITH
1 11/16" HYPERDOME




0
2
3
4
5
6
7
8
10
11
12
13
14
15



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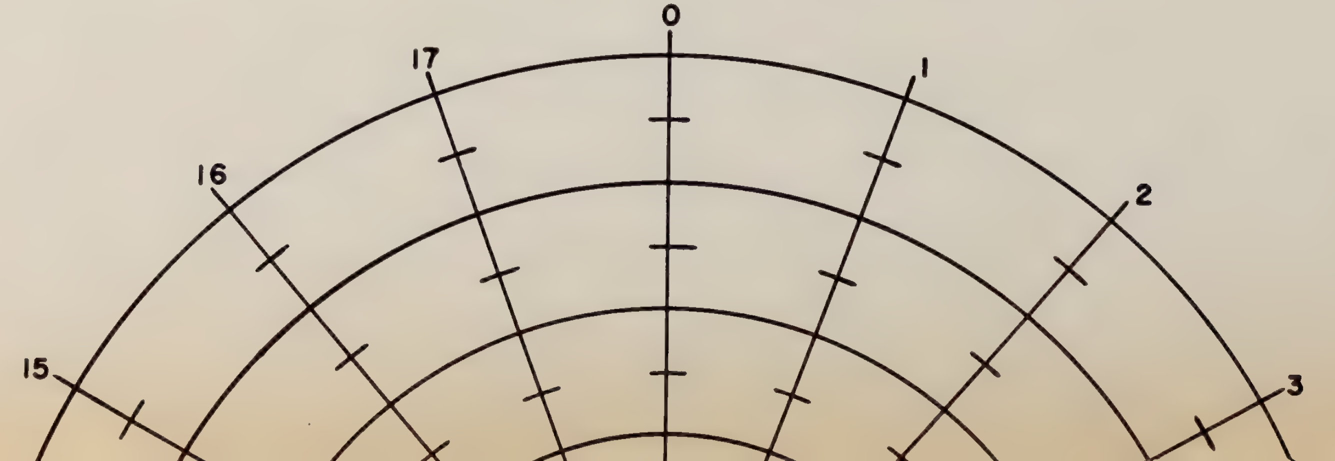
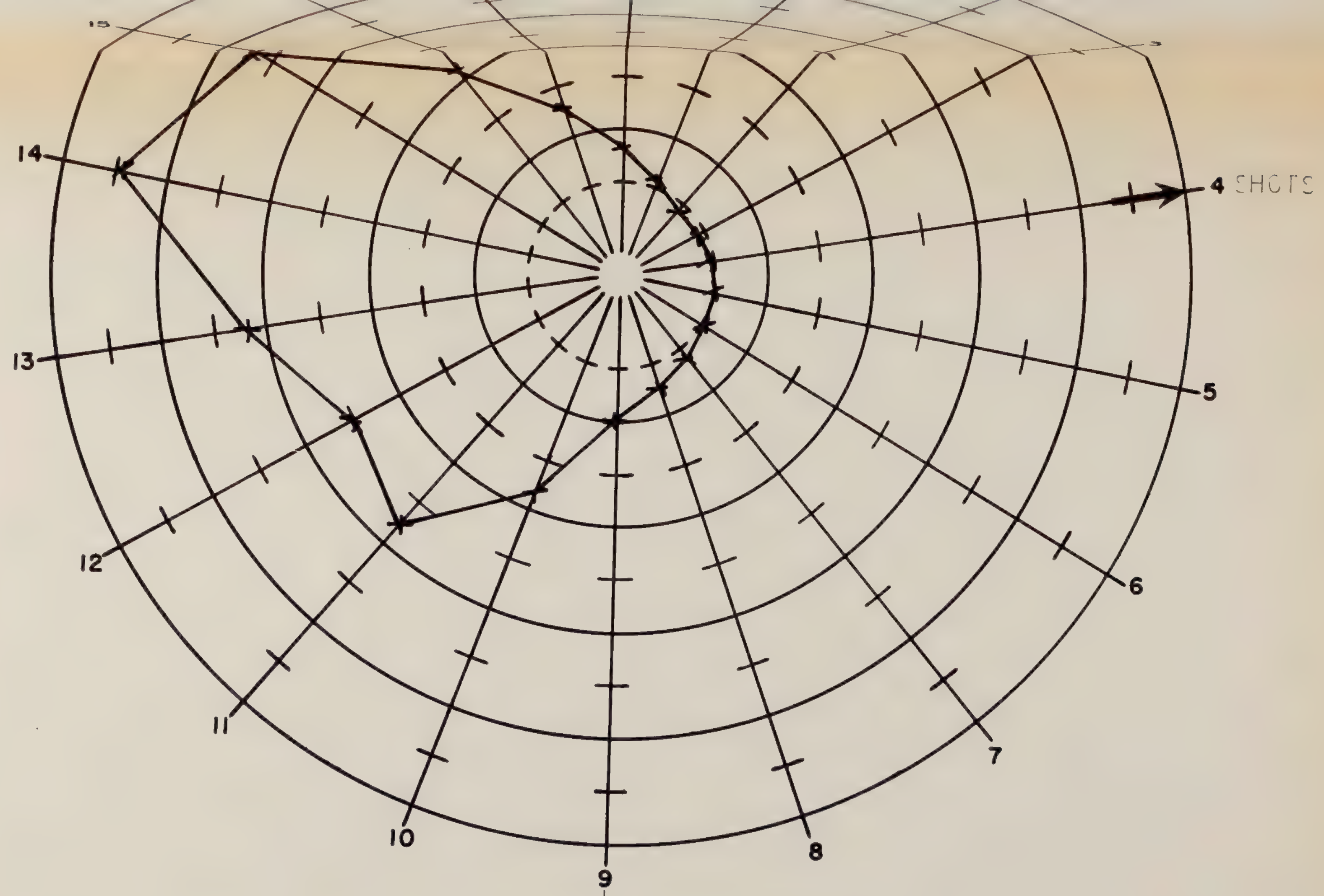
RADIORIENTATION PLOT

POT-B

NO.3-SHORT STRING-PERFORATED 1130-1131 ONE SHOT PER FOOT WITH
1 11/16" HYPERDOME





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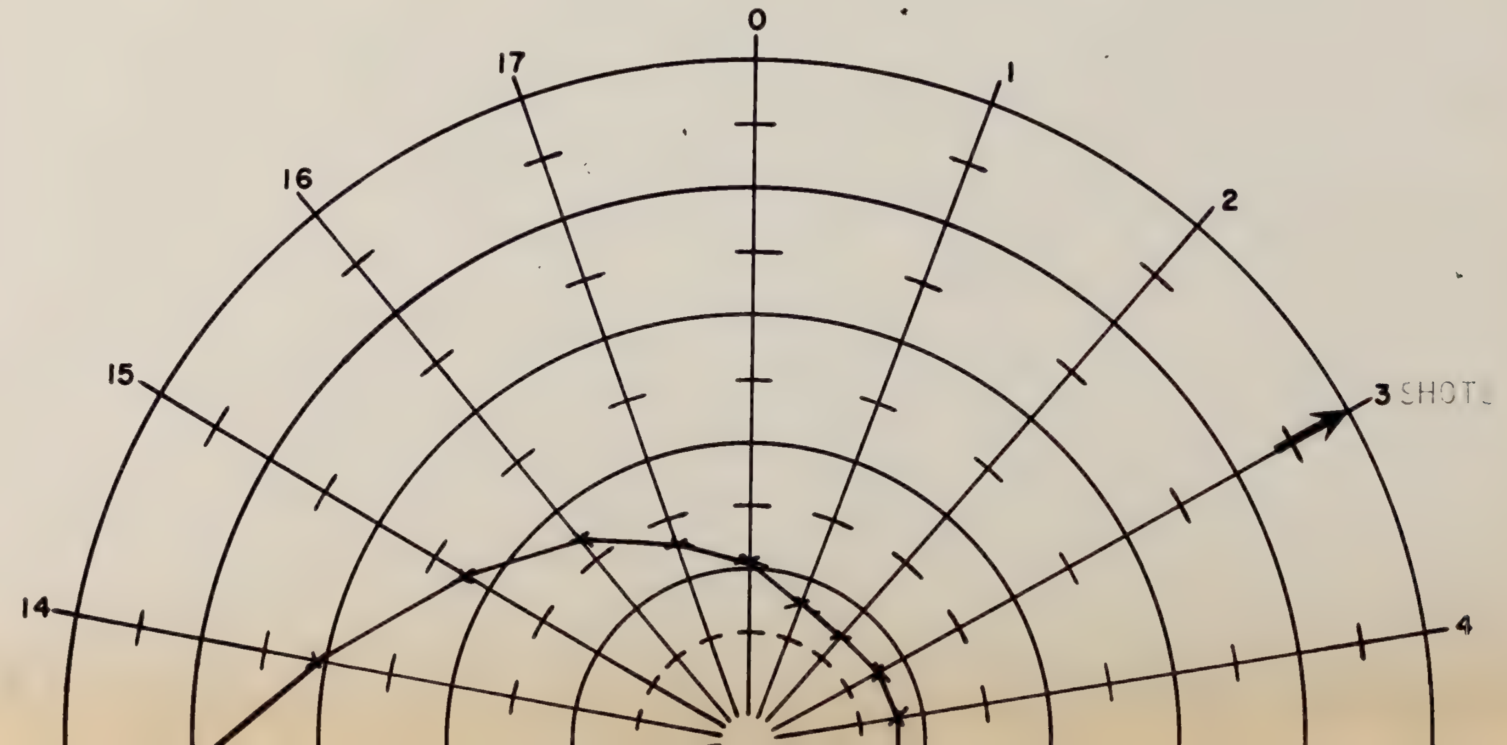
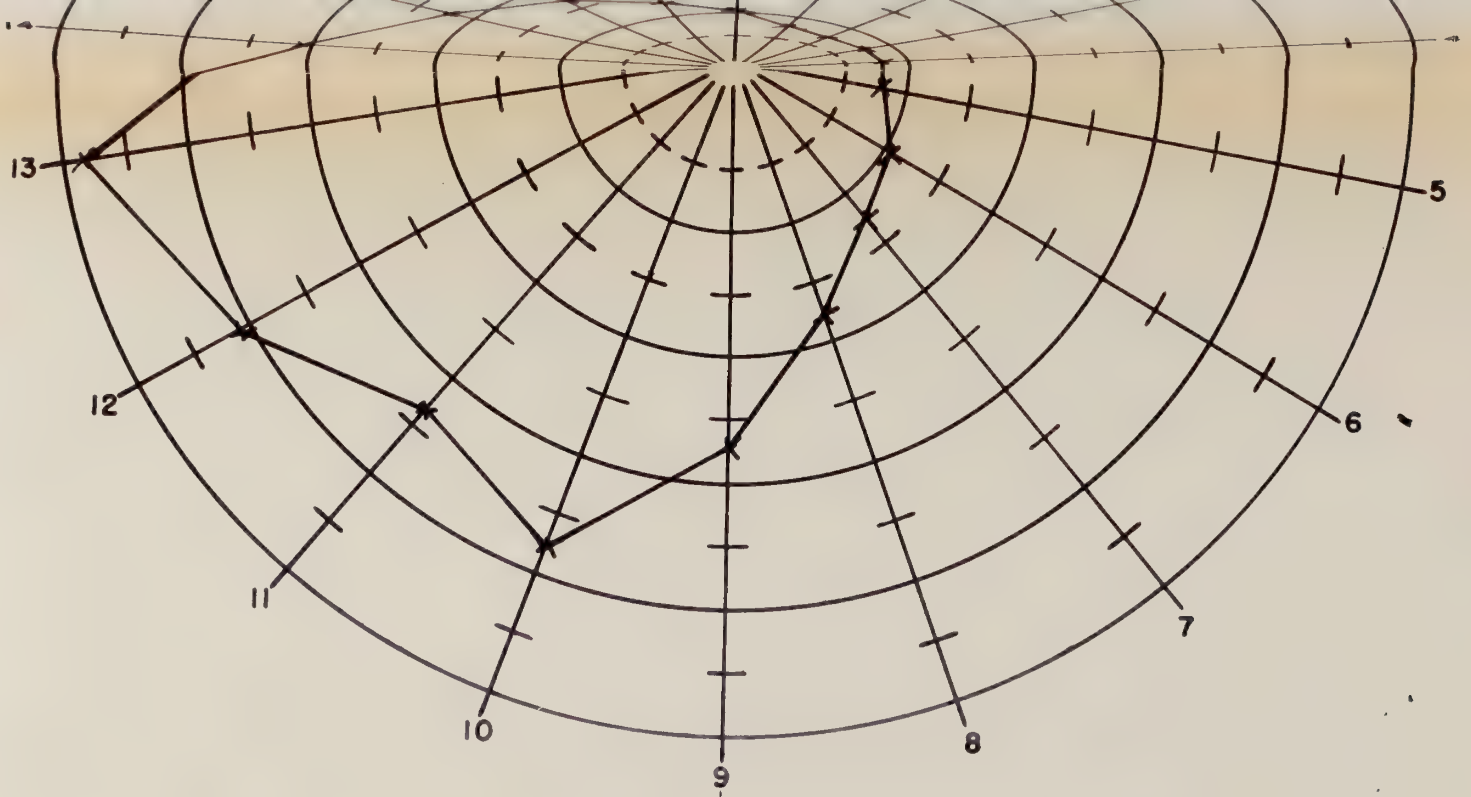
RADIORIENTATION PLOT

POT-B

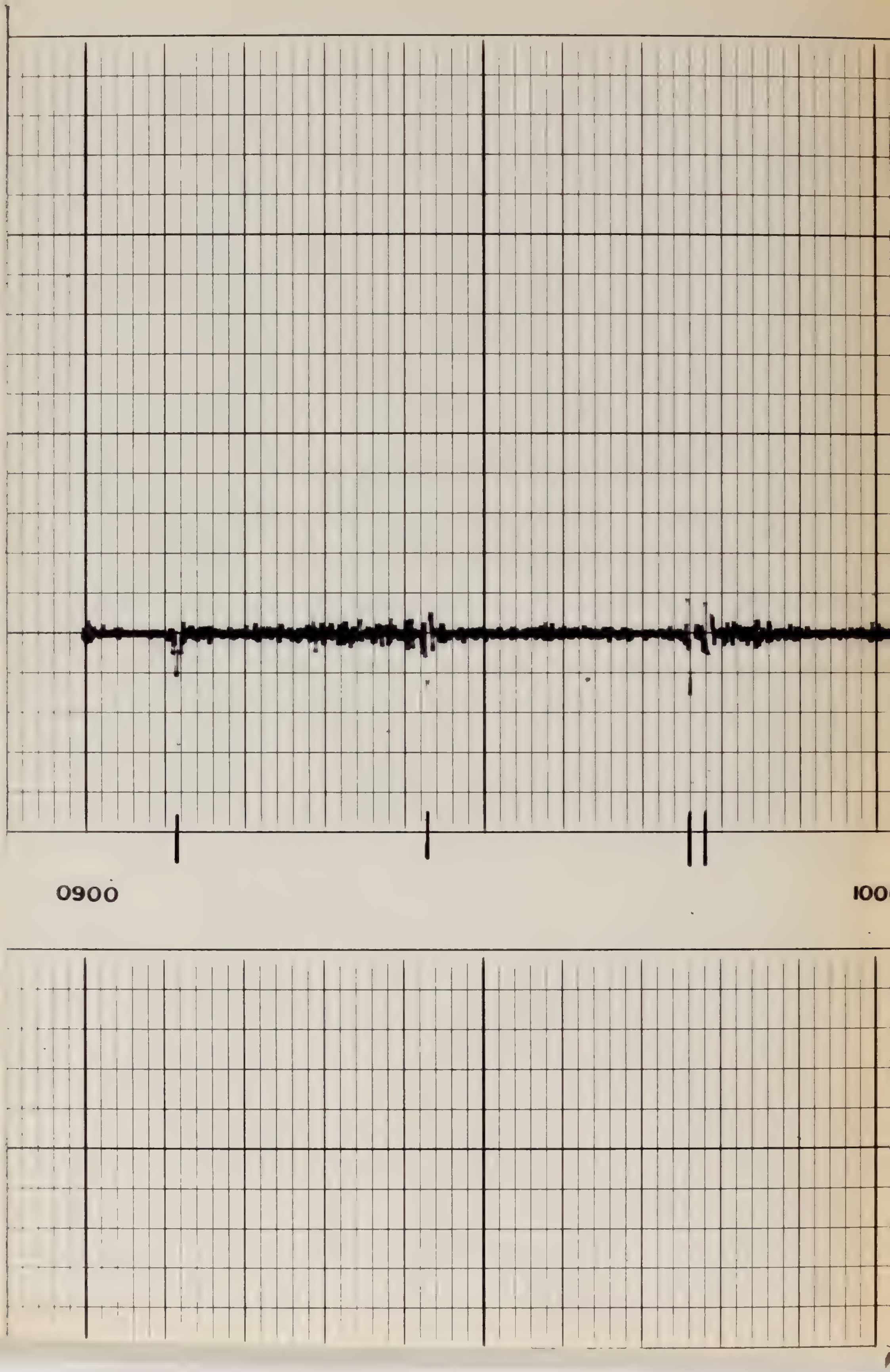
NO.3-SHORT STRING-PERFORATED 1100-1101 ONE SHOT PER FOOT WITH
1 11/16" HYPERDOME





[illegible] you in accordance with, but subject to, the General Terms and Conditions [illegible] hed to and [illegible]
[illegible]

Schlumberger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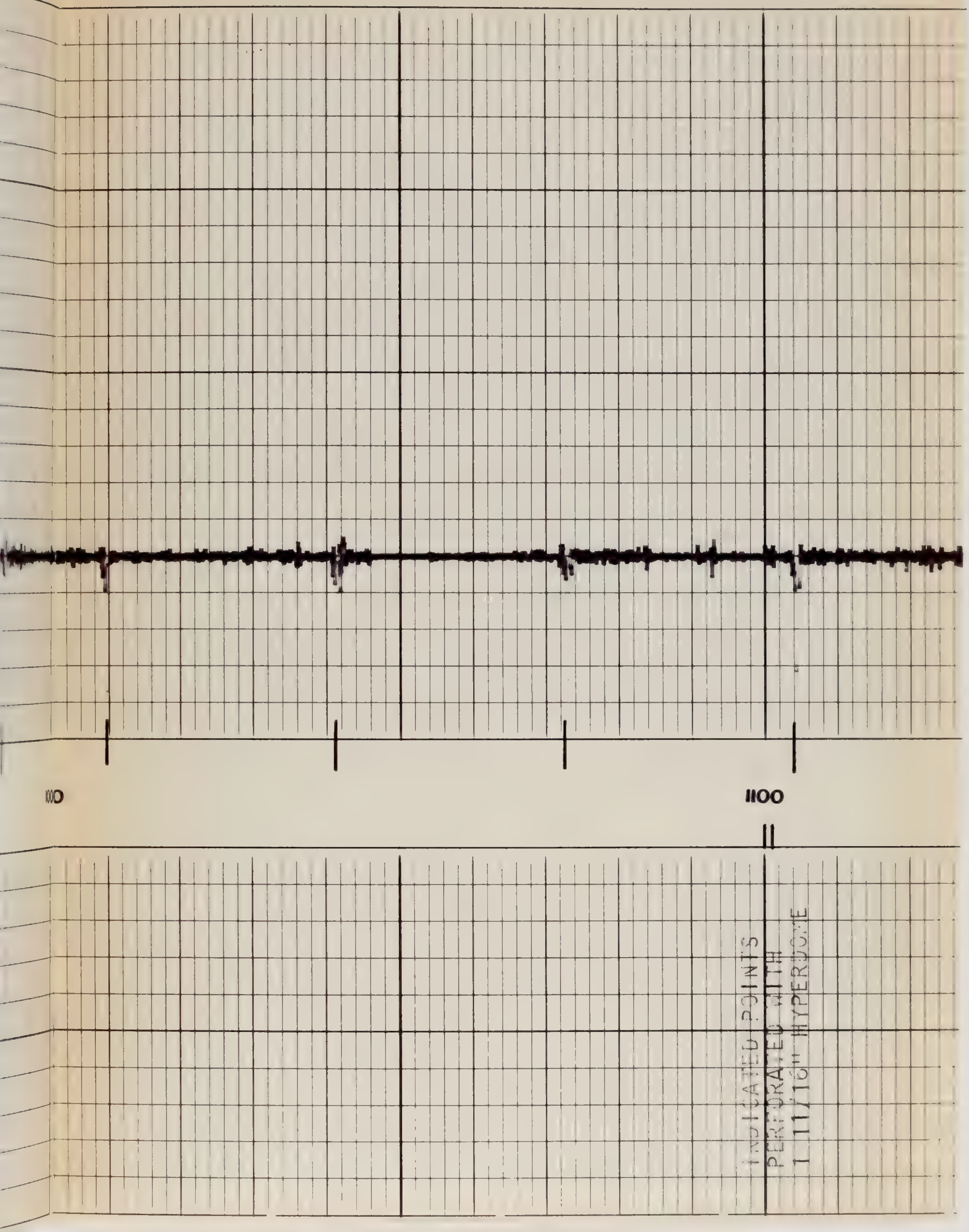
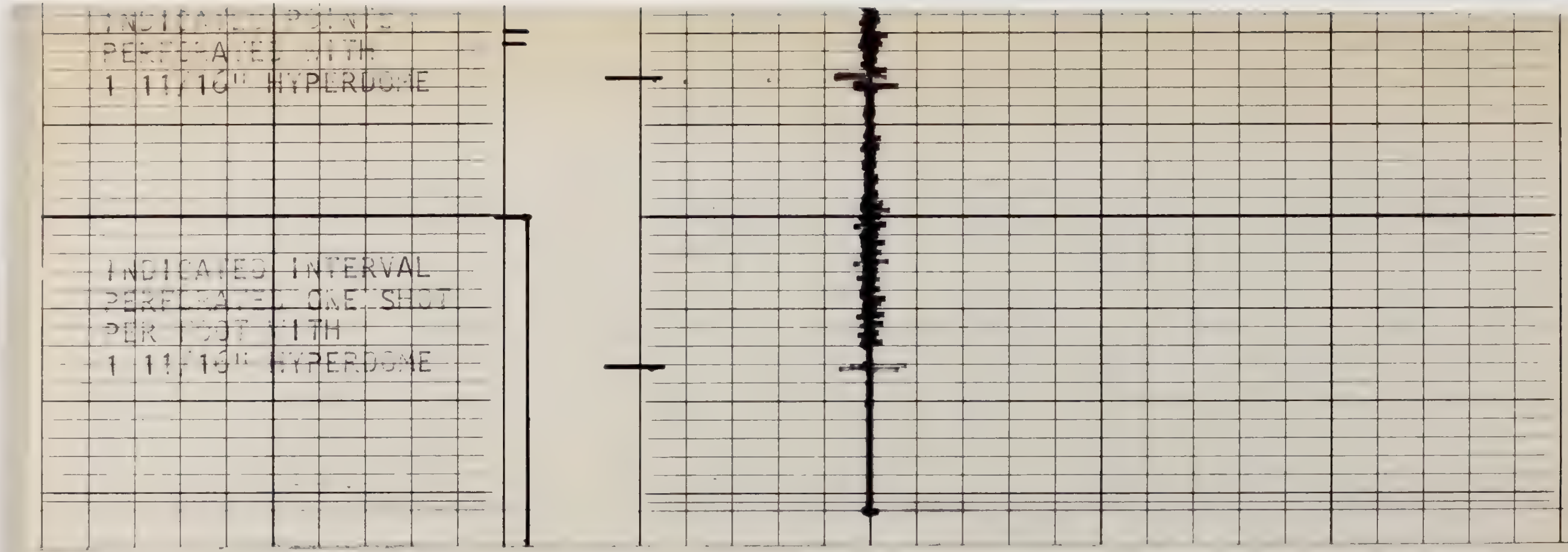
100



100
1100
INDICATED POINTS
PERFORATED WITH
1 11/16" HYPERDOME



COMPANY ATLANTIC RICHFIELD COMPANY

WELL S.G. NO.6

FIELD SORGHUM GULCH

RIO BLANCO COLORADO

Schlumberger

PRODUCTION LOGGING SERVICES

SWS-1425-B

Schlumberger

DUAL INDUCTION - LATEROLOG
WITH LINEAR CORRELATION LOG

COUNTY RIO BLANCO, COLO.
FIELD or LOCATION SORGHUM GULCH
WELL SORGHUM GULCH #6
COMPANY ATLANTIC RICHFIELD

COMPANY THE ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #6

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

Location. API Serial No.
2523 FSL & 2251 FWL
Sec. 7 Twp. 3S Rge. 96W

Other Services:
BHC-GR-VDL
FDC-CNL-GR
HRT

Permanent Datum: GL ; Elev.: 6888
Log Measured From GL , Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B.
D.F.
G.L. 6888

Date	8/23/74			
Run No.	ONE			
Depth—Driller	2220			
Depth—Logger	2220			
Btm. Log Interval	2216			
Top Log Interval	61			
Casing—Driller	8-5/8@ 59	@	@	@
Casing—Logger	61			
Bit Size	6-1/4			
Type Fluid in Hole	WATER			
Fluid Level	466			
Dens. Visc.	— —			
pH Fluid Loss	— — ml	ml	ml	ml
Source of Sample	PIT			
R_m @ Meas. Temp.	5.04 @88 °F	@ °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
R_{mc} @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
Source: R_{mf} R_{mc}				
R_m @ BHT	@ °F	@ °F	@ °F	@ °F
Time Since Circ.	1-1/2 HOURS			
Max. Rec. Temp.	110 °F	°F	°F	°F
Equip. Location	5602 GJ			
Recorded By	BARGHOUTI			
Witnessed By	ELLARDI, TAIT			

The well name, location and borehole reference data were furnished by the customer.

FOLD HERE

FOLD HERE The well name, location and borehole reference data were furnished by the customer.

CHANGES IN MUD TYPE OR ADDITIONAL SAMPLES

Date / Sample No.				
Depth - Driller				
Type Fluid in Hole				
Dens. / Visc.				
ph / Fluid Loss		ml		ml
Source of Sample				
R_m @ Meas. Temp.	@	°F	@	°F
R_{mf} @ Meas. Temp.	@	°F	@	°F
R_{mc} @ Meas. Temp.	@	°F	@	°F
Source: R_{mf} / R_{mc}				
R_m @ BHT	@	°F	@	°F
R_{mf} @ BHT	@	°F	@	°F
R_{mc} @ BHT	@	°F	@	°F

SCALE CHANGES

Type Log	Depth	Scale Up Hole	Scale Down Hole

EQUIPMENT DATA

Run No.	ONE			
Panel No.	C-180			
Cart. No.	B-163			
Sonde No.	DB-49			
Mem. Panel No.	B-238			
G.R. Cart No.				
G.R. Panel No.				
TTR No.				
Cent. Device				
Stand off - Inches				
Time Const. - Sec.				
Speed - F.P.M.	70			

REMARKS

Service Order No. - 15133

IN DOUBT LOG VALIDITY DUE TO CALIBRATIONS

" NON-STANDARD" PRESENTATION

☐ Surface determined sonde errors used for 6FF40.

☐ 6FF40 sonde error corrected for inch

borehole signal at $R_m =$

☐ 6FF40 zero set in hole at depth of 1250 feet.

CALIBRATION DATA

CALIBRATION:	BACKGND. CPS.	SOURCE CPS.	GALV. INCR. DIVISION	SENS. TAP (FOR CAL.)	SENS. TAP (RECORD)	TIME CONST.
GAMMA RAY:						

CALIBRATION:	BACKGND. CPS.	SOURCE CPS.	GALV. INCR. DIVISION	SENS. TAP (FOR CAL.)	SENS. TAP (RECORD)	TIME CONST.	
GAMMA RAY:							

All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to Clause 7 of our General Terms and Conditions as set out in our current Price Schedule.

SPONTANEOUS-POTENTIAL
MILLIVOLTS

— |15 ⟷| + MV

CONDUCTIVITY
MILLIMHOS/M = $\frac{1000}{\text{OHMS. M}^2\text{/M}}$

DEEP INDUCTION LOG

400 200 0

RESISTIVITY
OHMS. M²/M

DEEP INDUCTION LOG

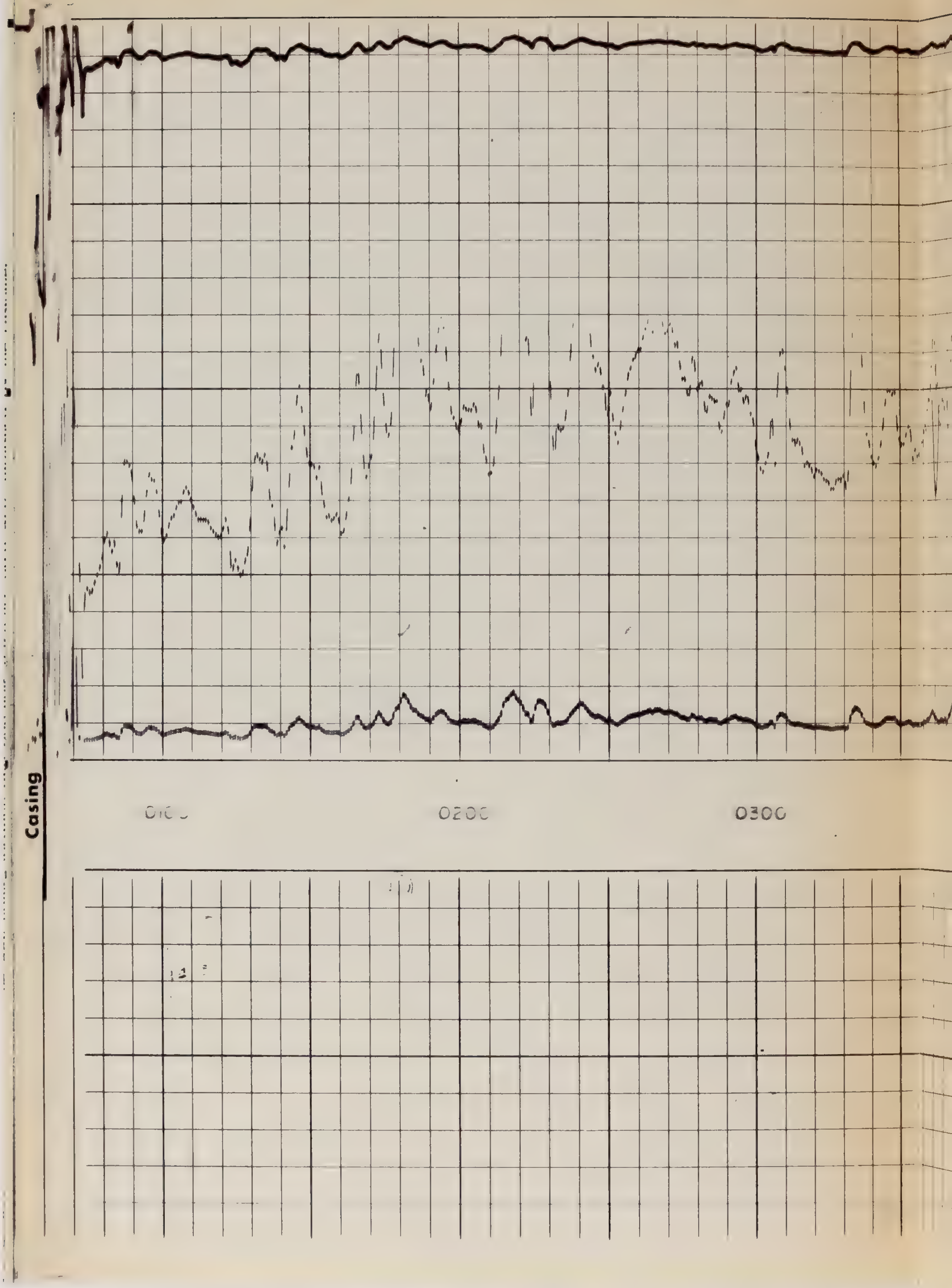
0 100

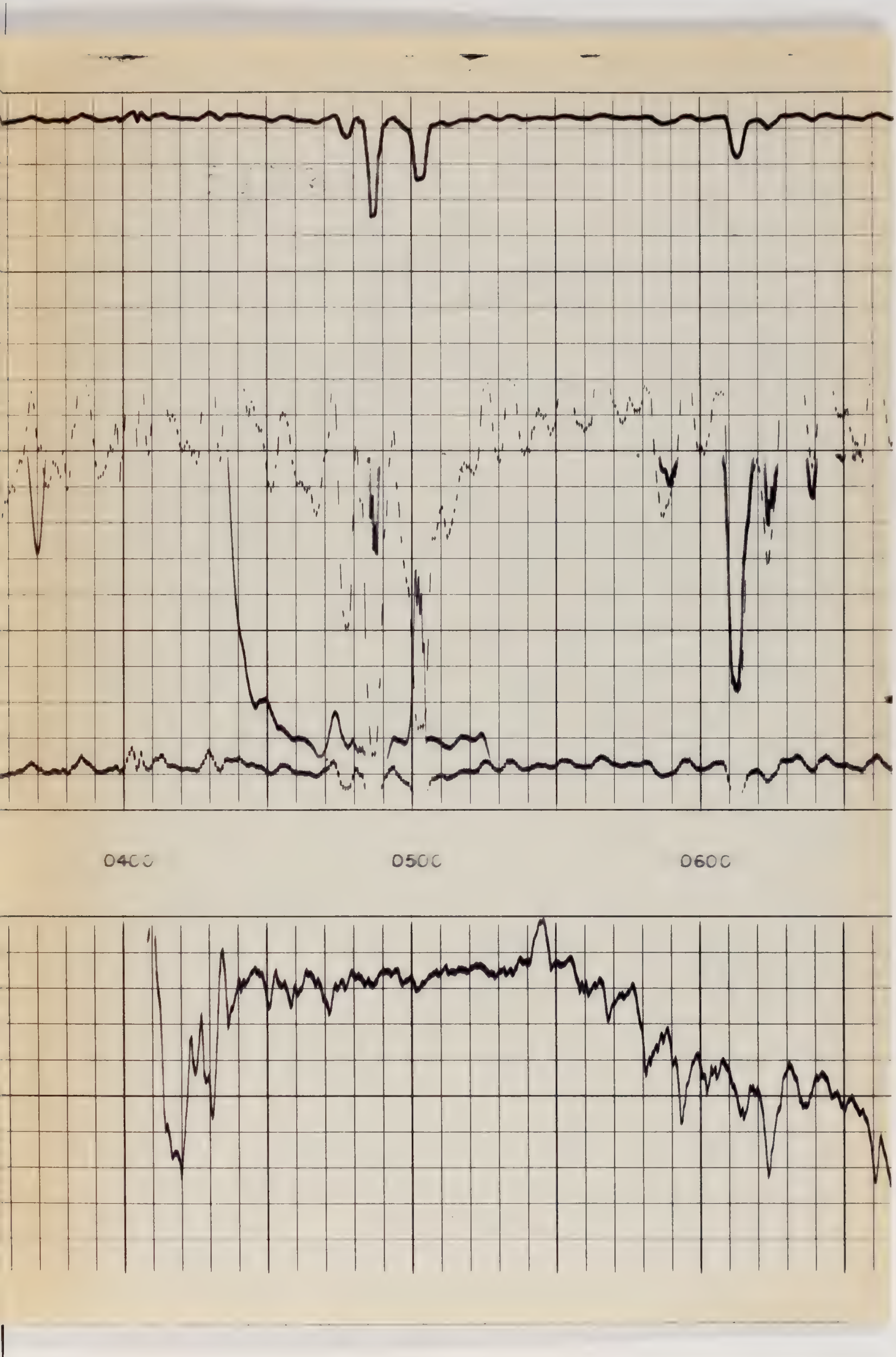
0 1000

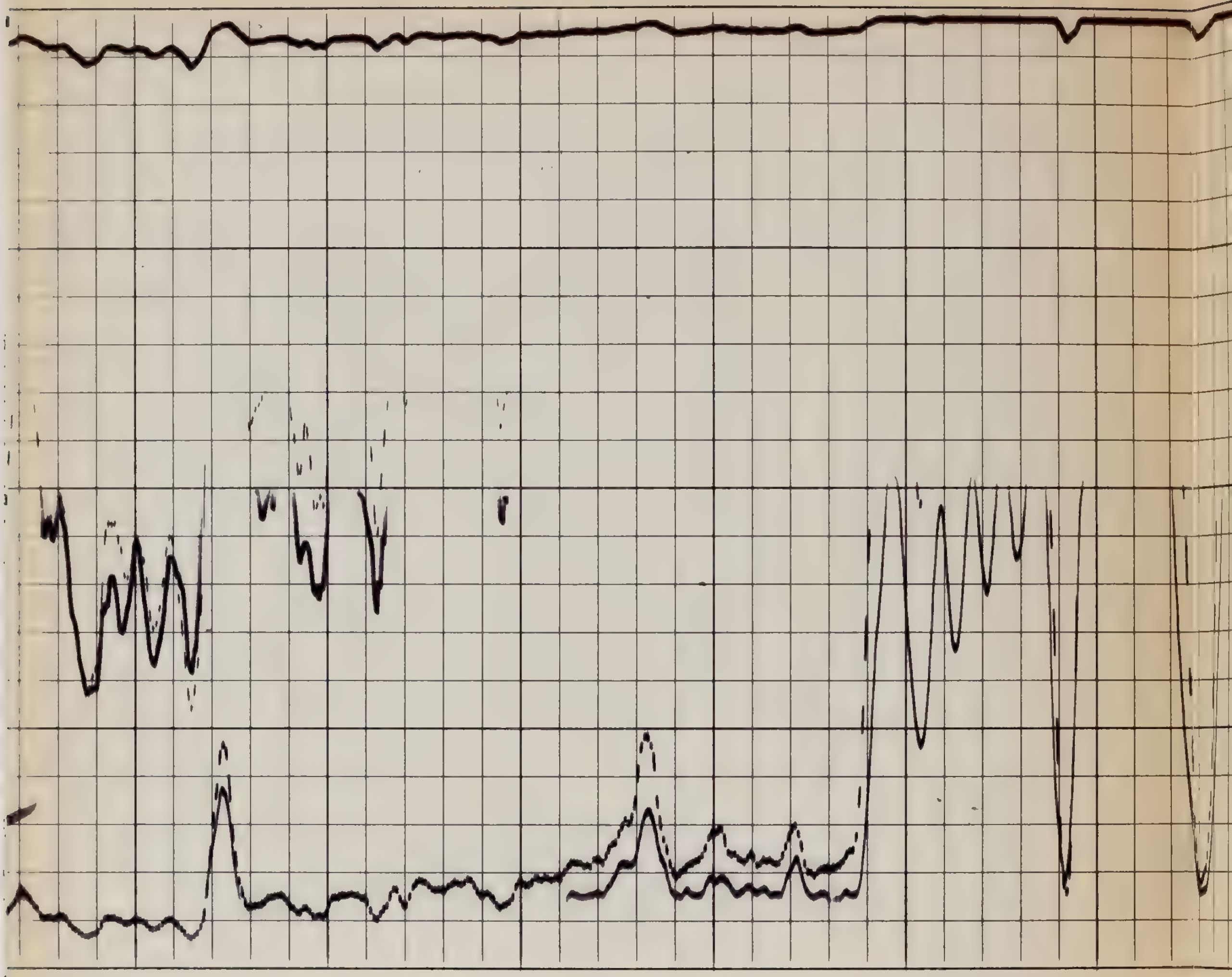
AVERAGED LATEROLOG - 8

0 100

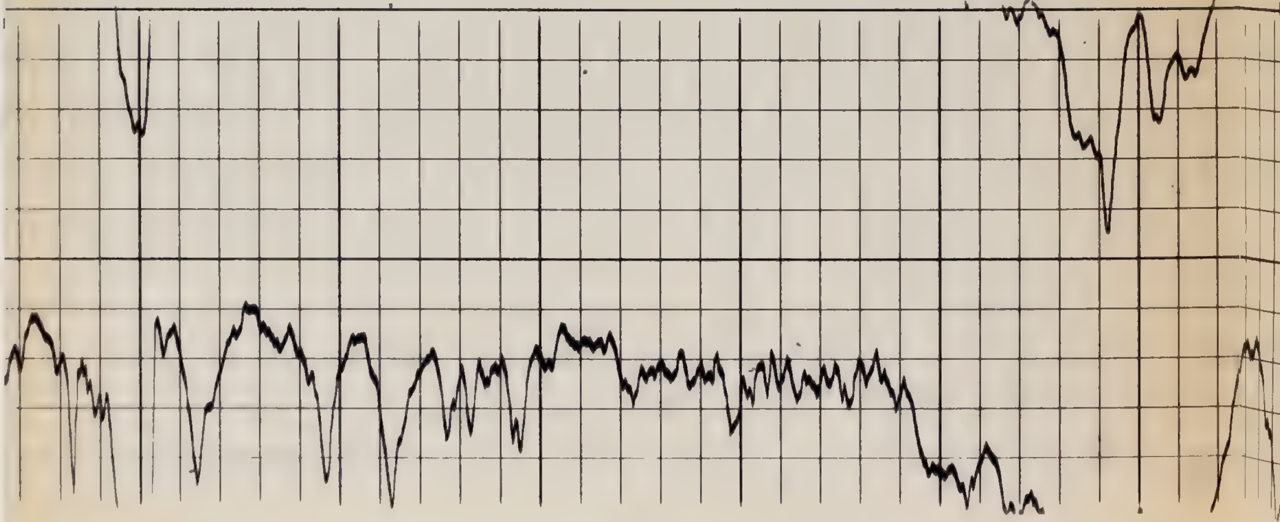
0 1000

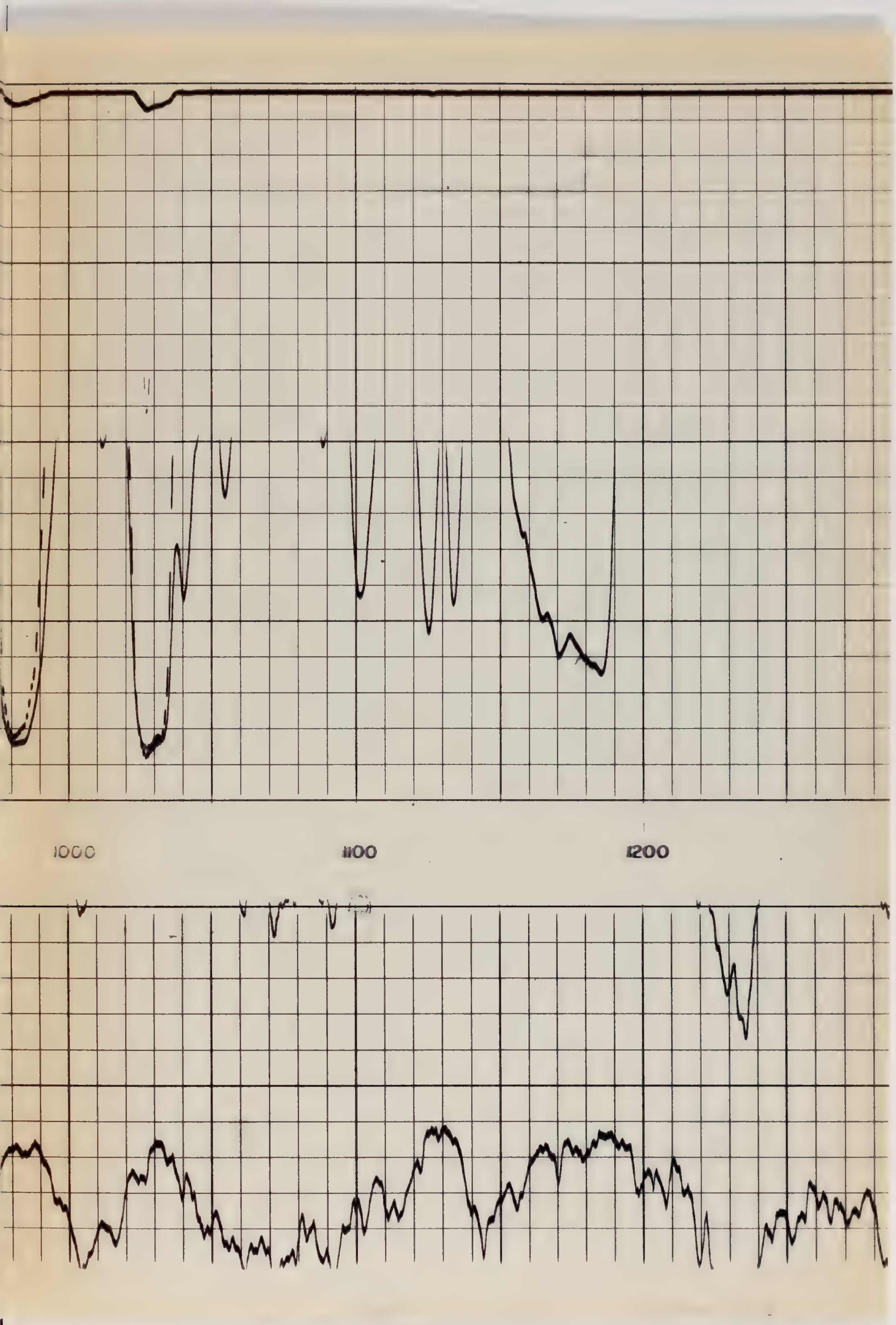

Casing
0100
0200
0300

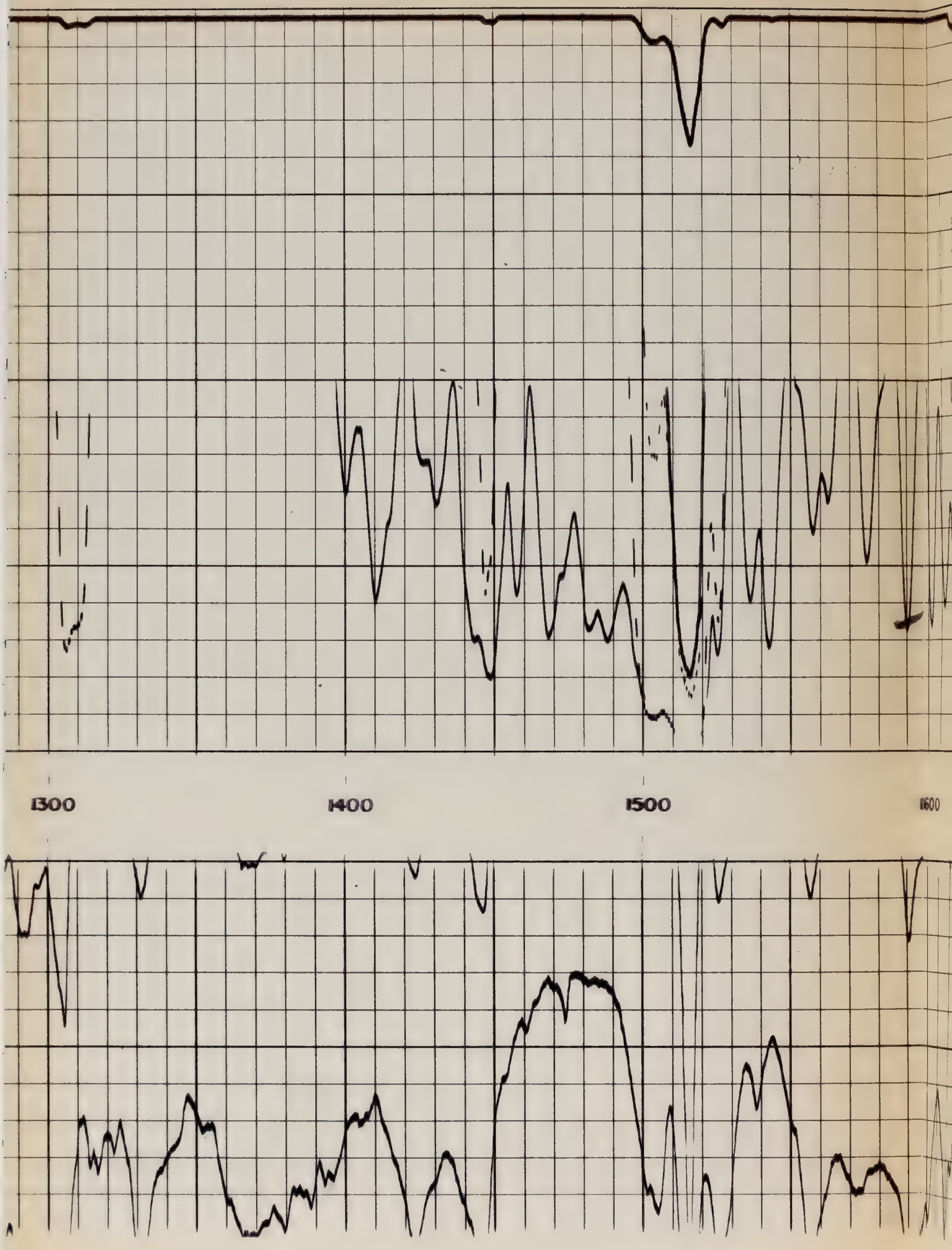

0400
0500
0600

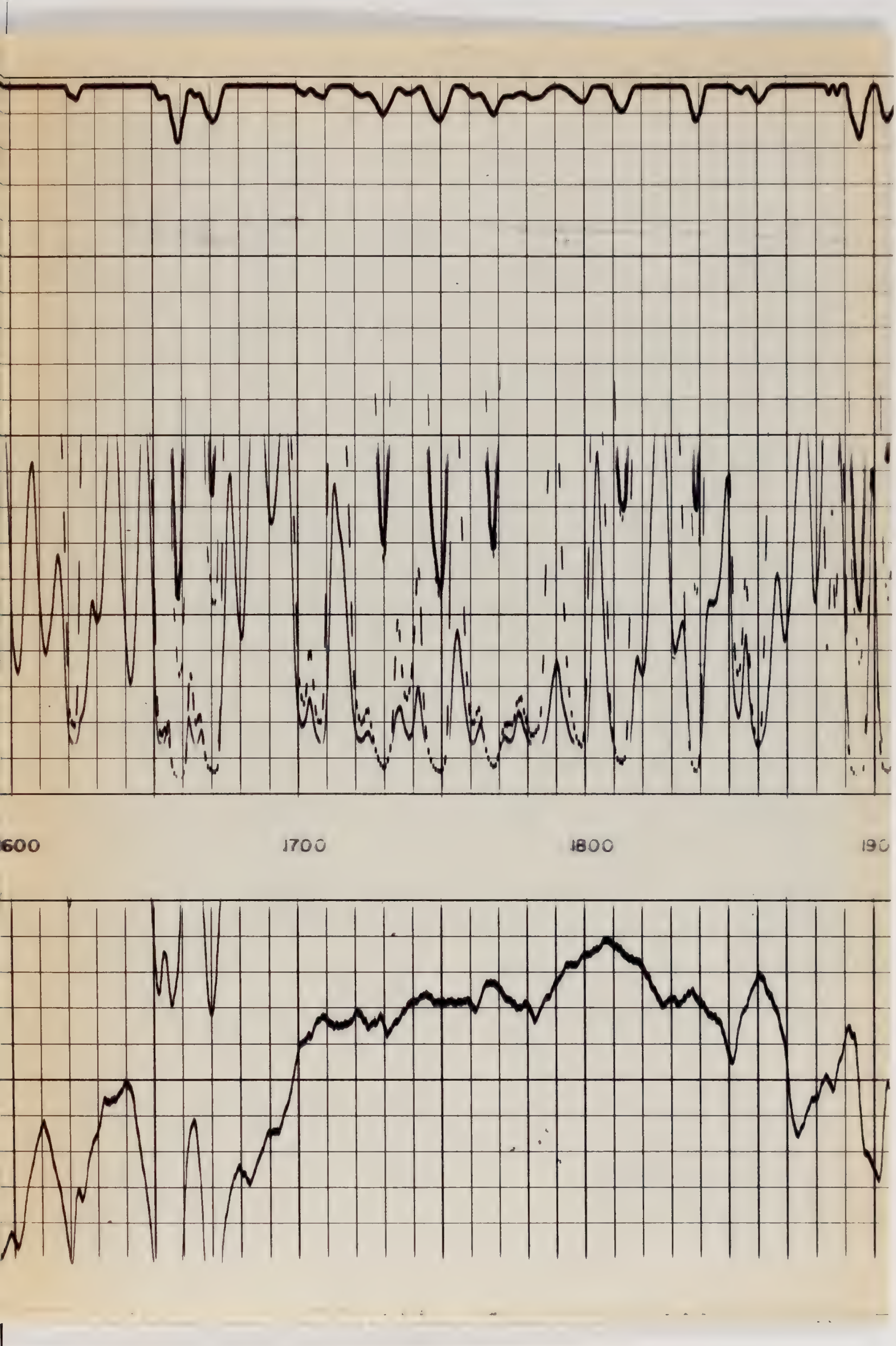


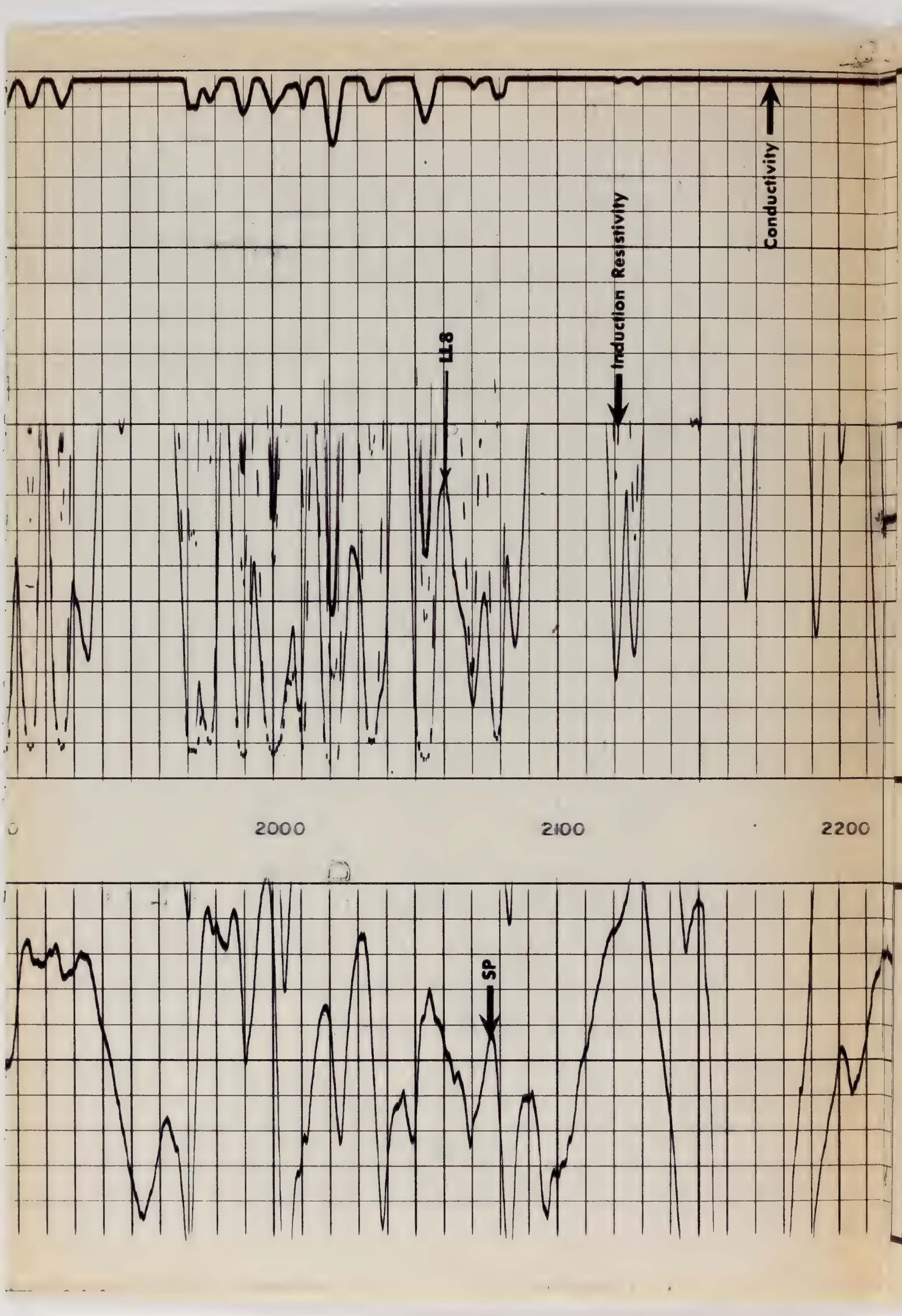
0700
0800
0900




1000
1100
1200


1300
1400
1500
1600


600
1700
1800
190


Conductivity
Induction Resistivity
LL8
2000
2100
2200
SP

AVERAGED LATEROLOG — 8

0 100

0 1000

DEEP INDUCTION LOG

0 100

0 1000

RESISTIVITY

OHMS. M^2/M

15

— MV +

400 200 0

DEEP INDUCTION LOG

SPONTANEOUS-POTENTIAL

MILLIVOLTS

DEPTHS

CONDUCTIVITY

MILLIMHOS/M $= \frac{1000}{\text{OHMS. } M^2/M}$

DETAIL LOG

5″ = 100′

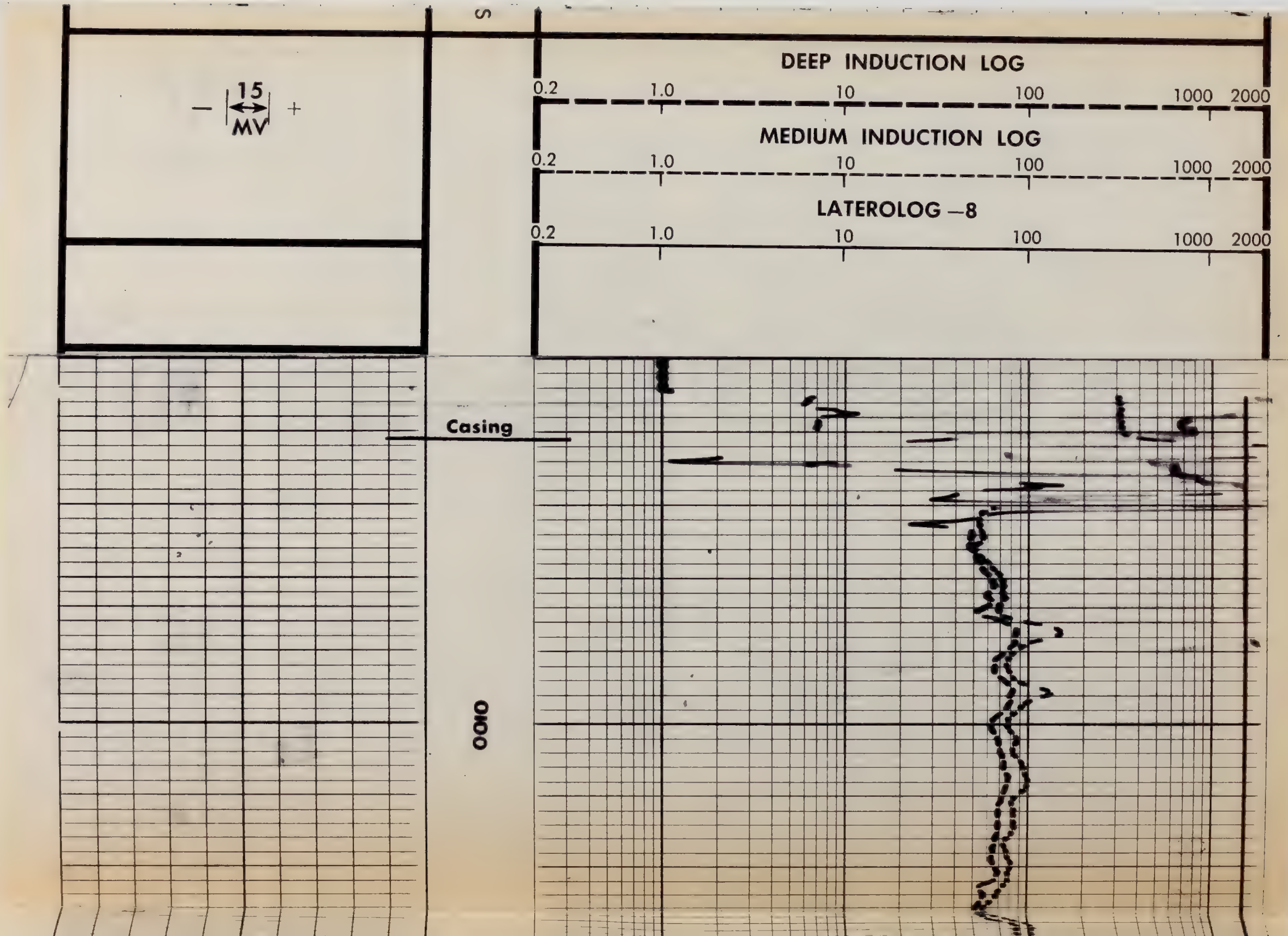
SPONTANEOUS-POTENTIAL

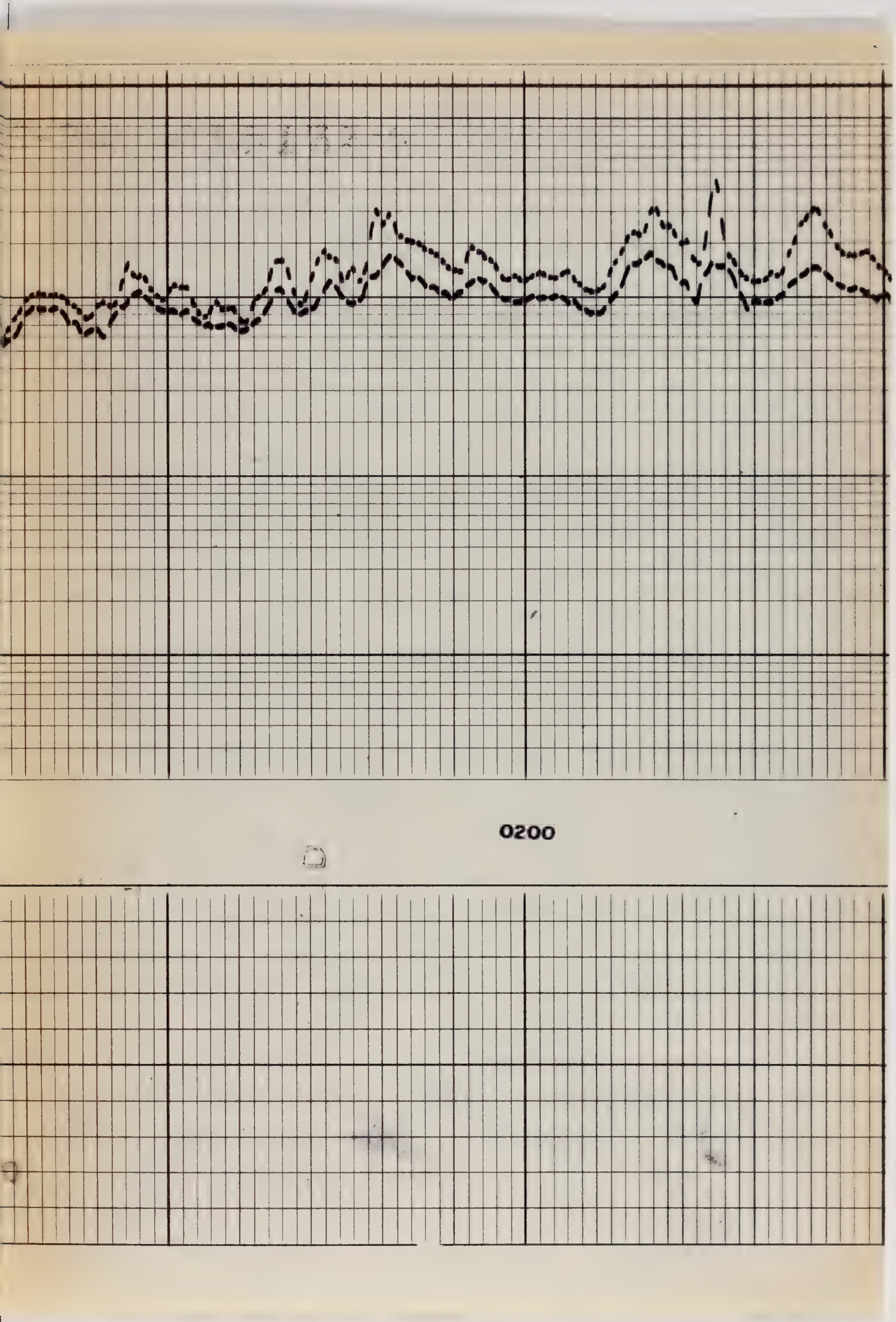
MILLIVOLTS

DEPTH

RESISTIVITY

OHMS. M^2 M


S
15
MV
DEEP INDUCTION LOG
0.2
1.0
10
100
1000
2000
MEDIUM INDUCTION LOG
0.2
1.0
10
100
1000
2000
LATEROLOG —8
0.2
1.0
10
100
1000
2000
Casing
0100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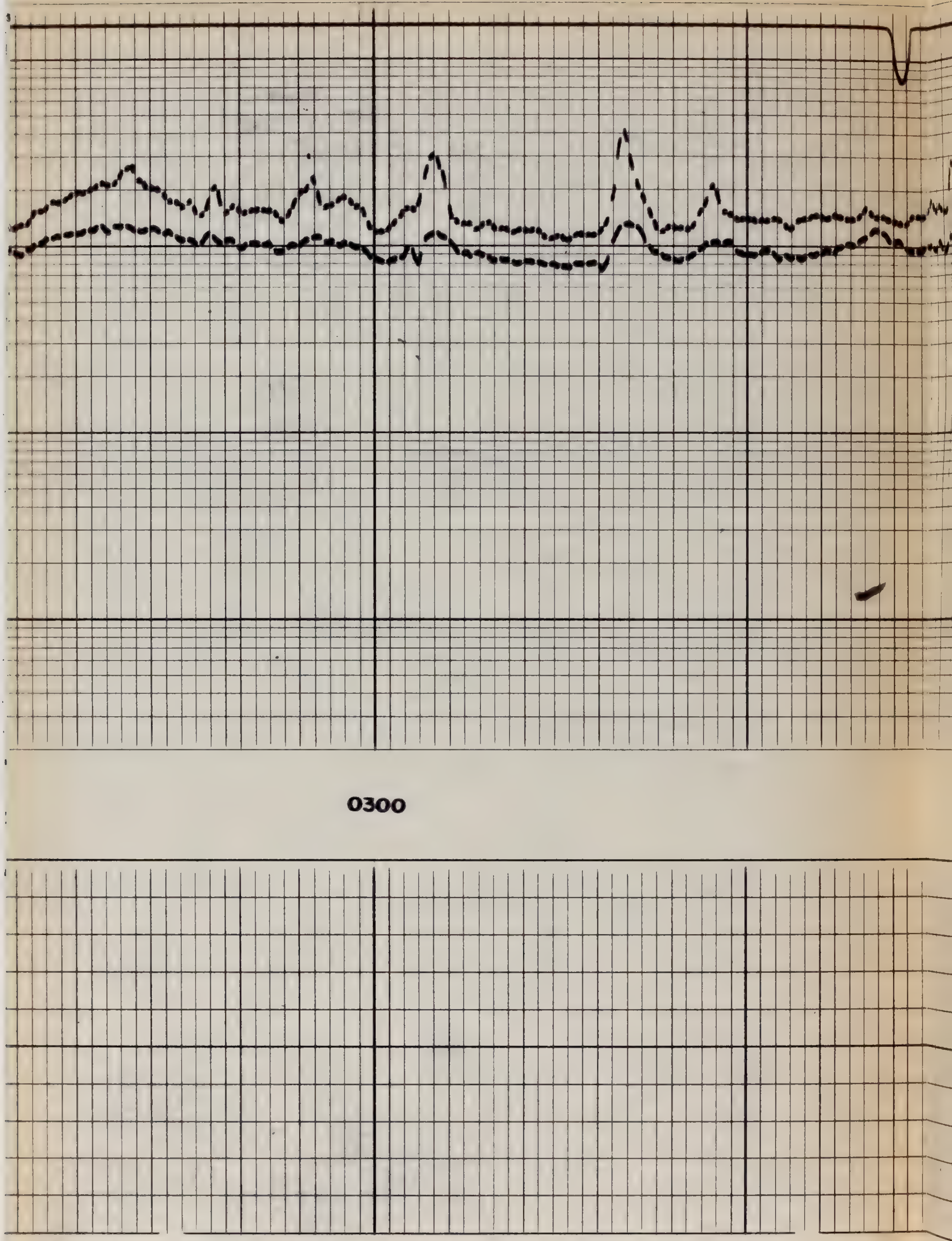
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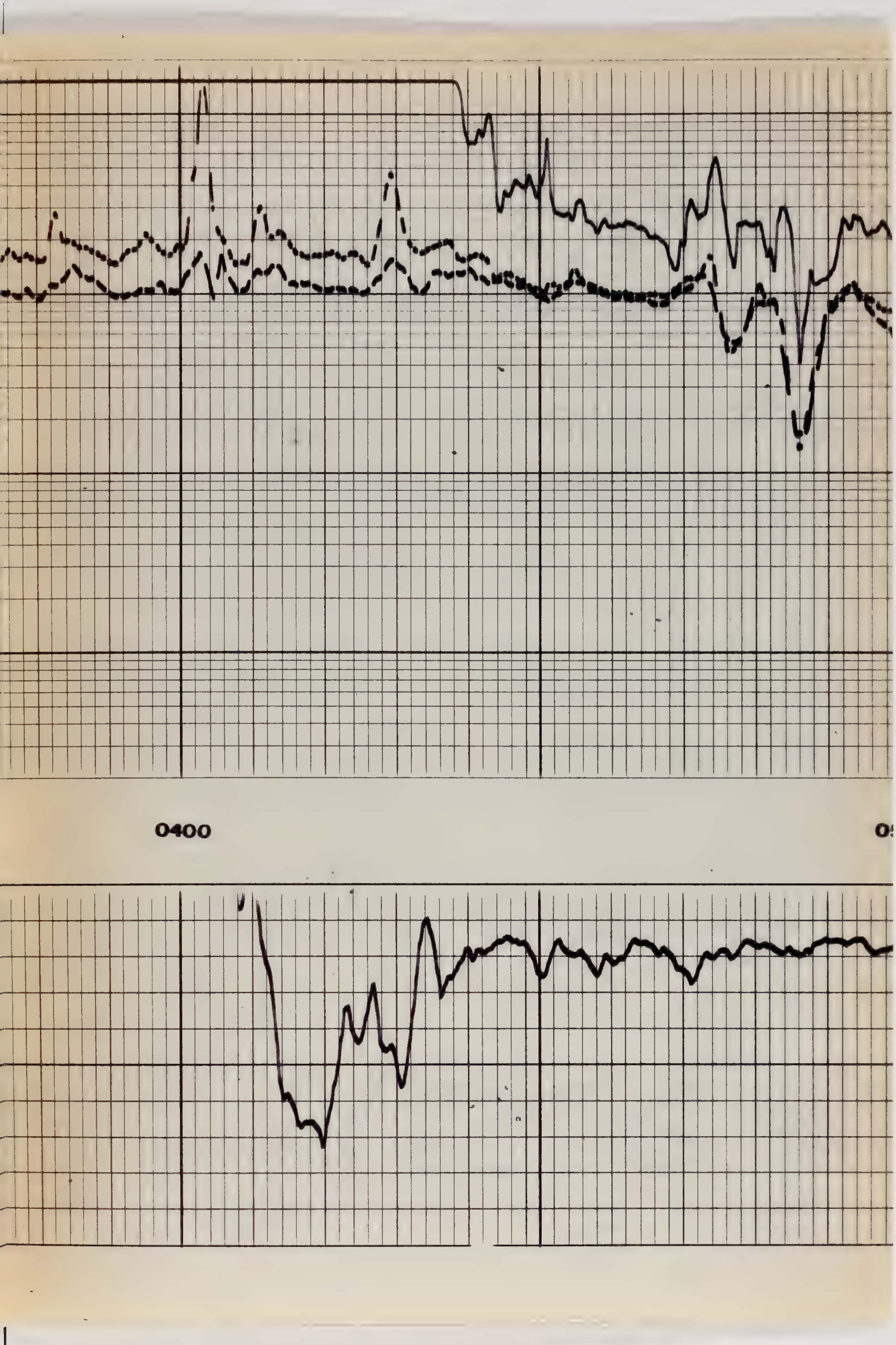
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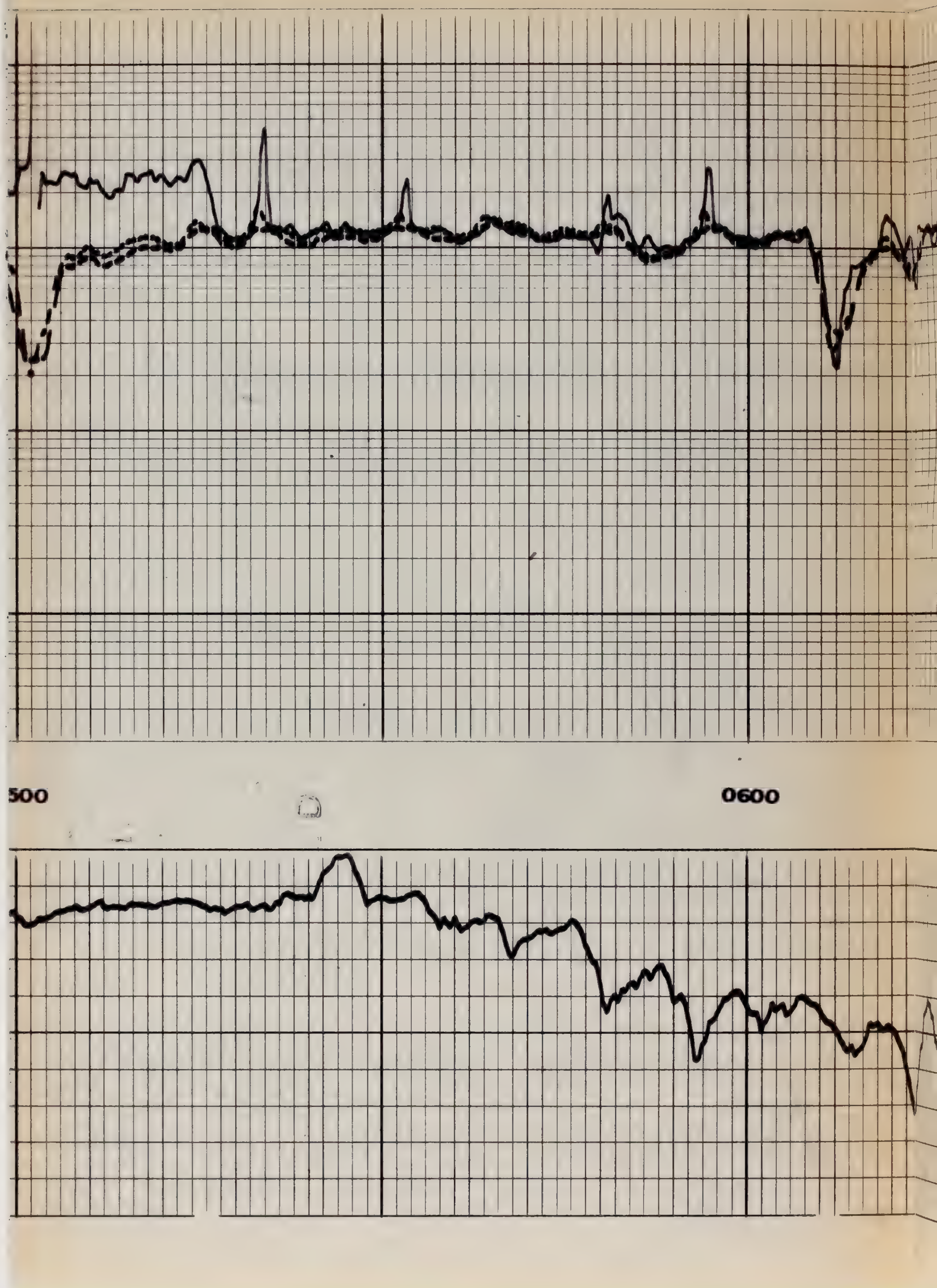
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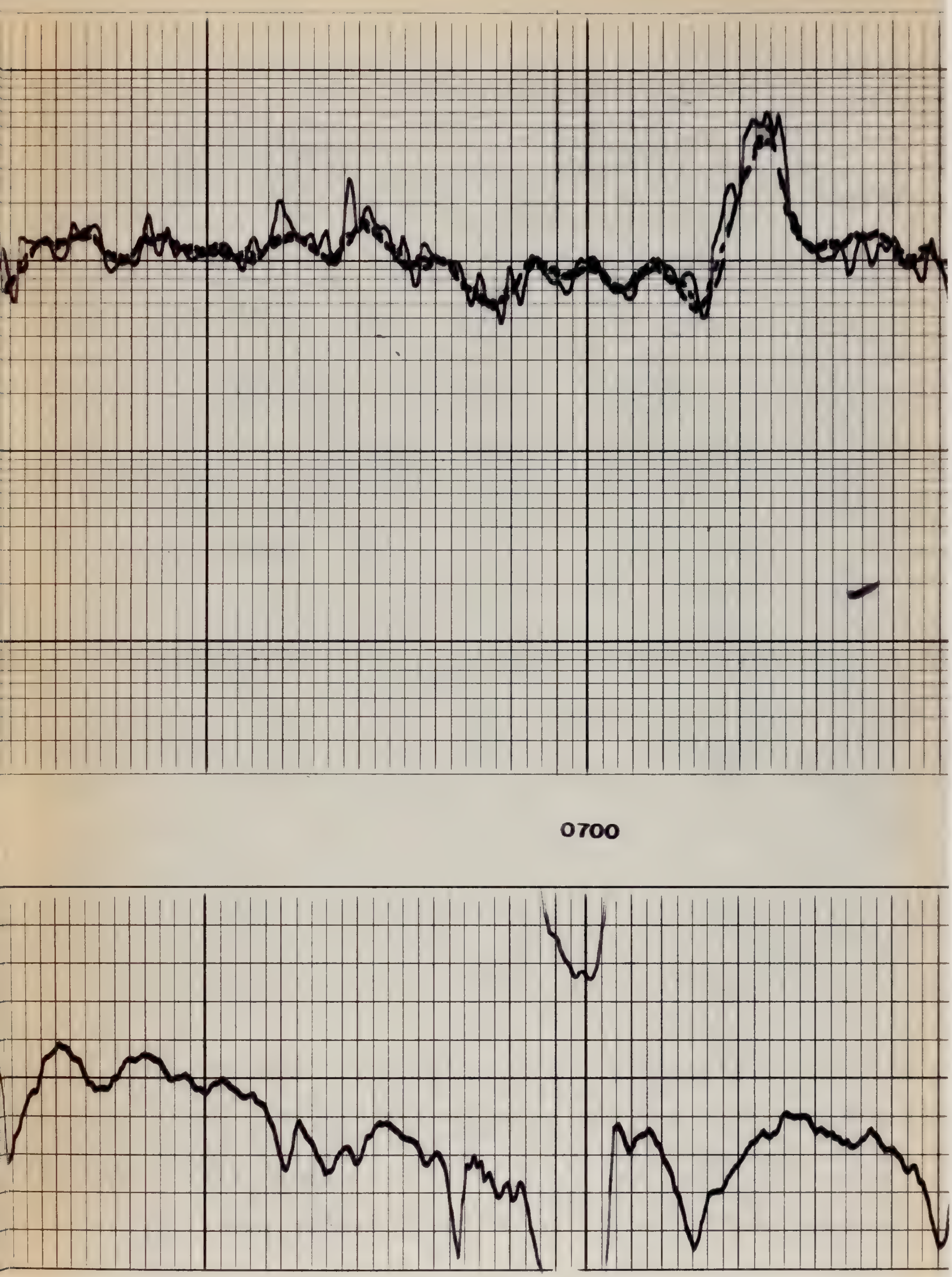
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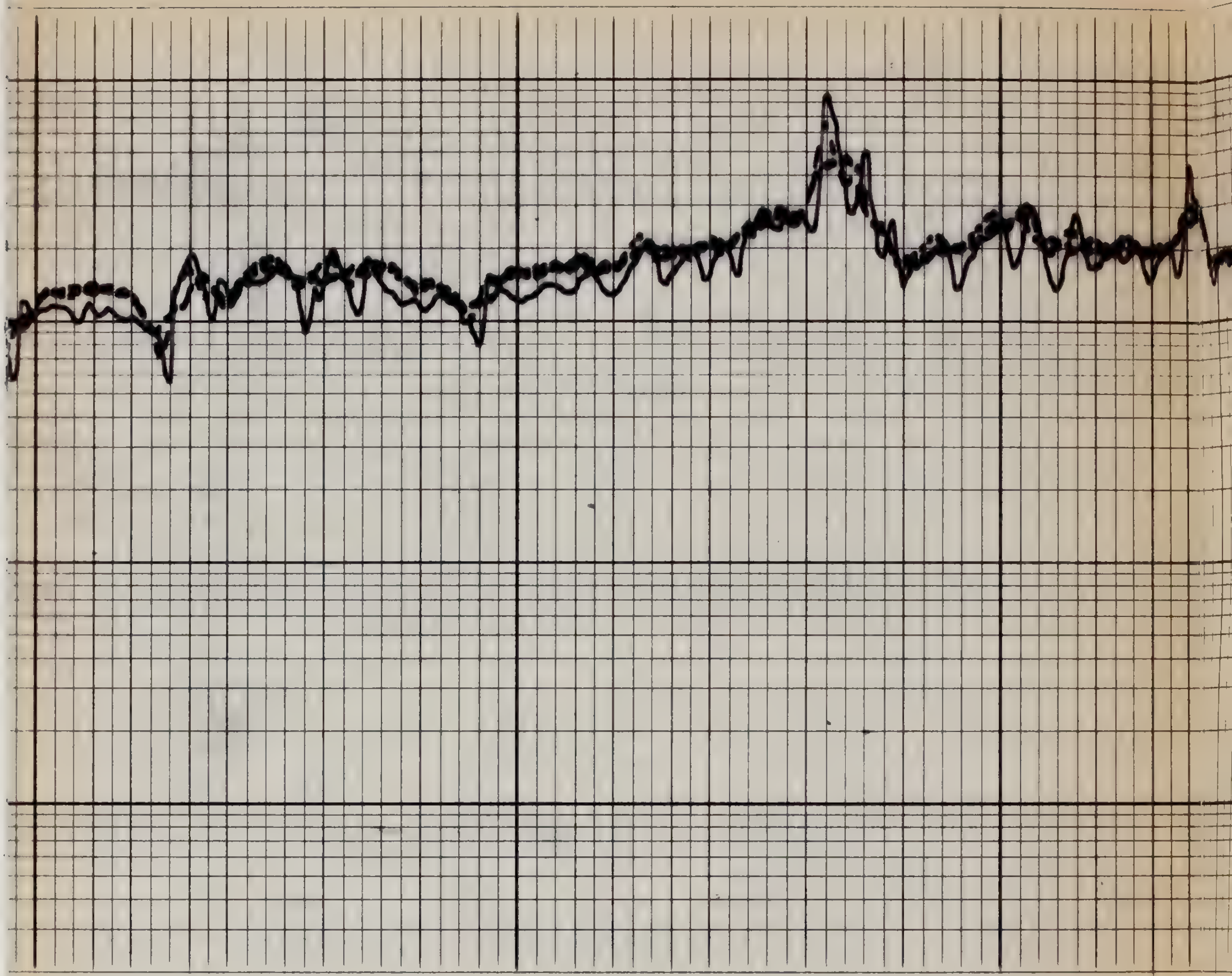

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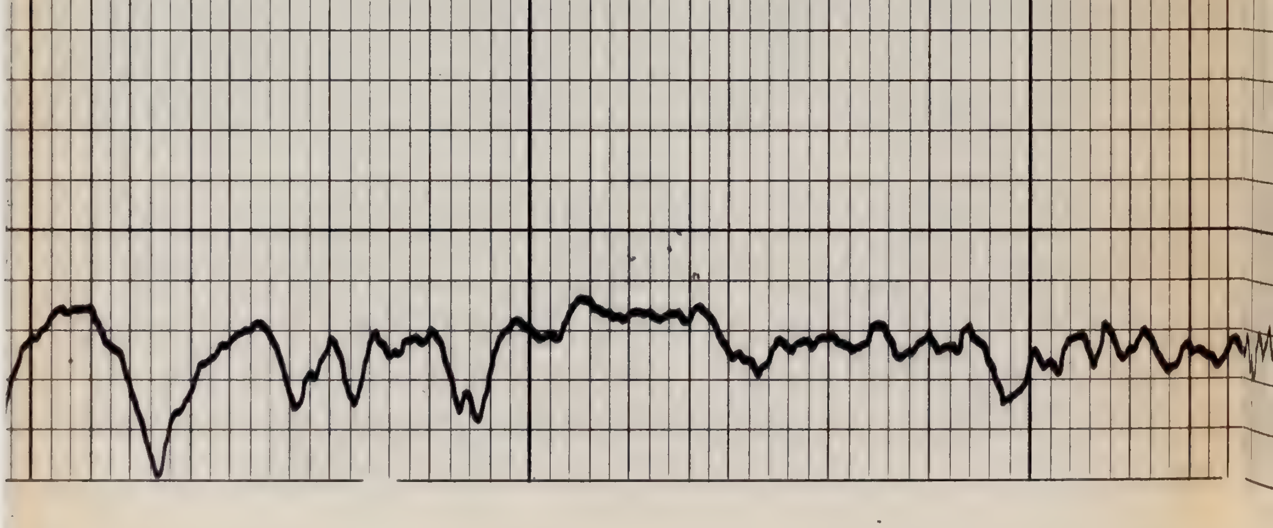

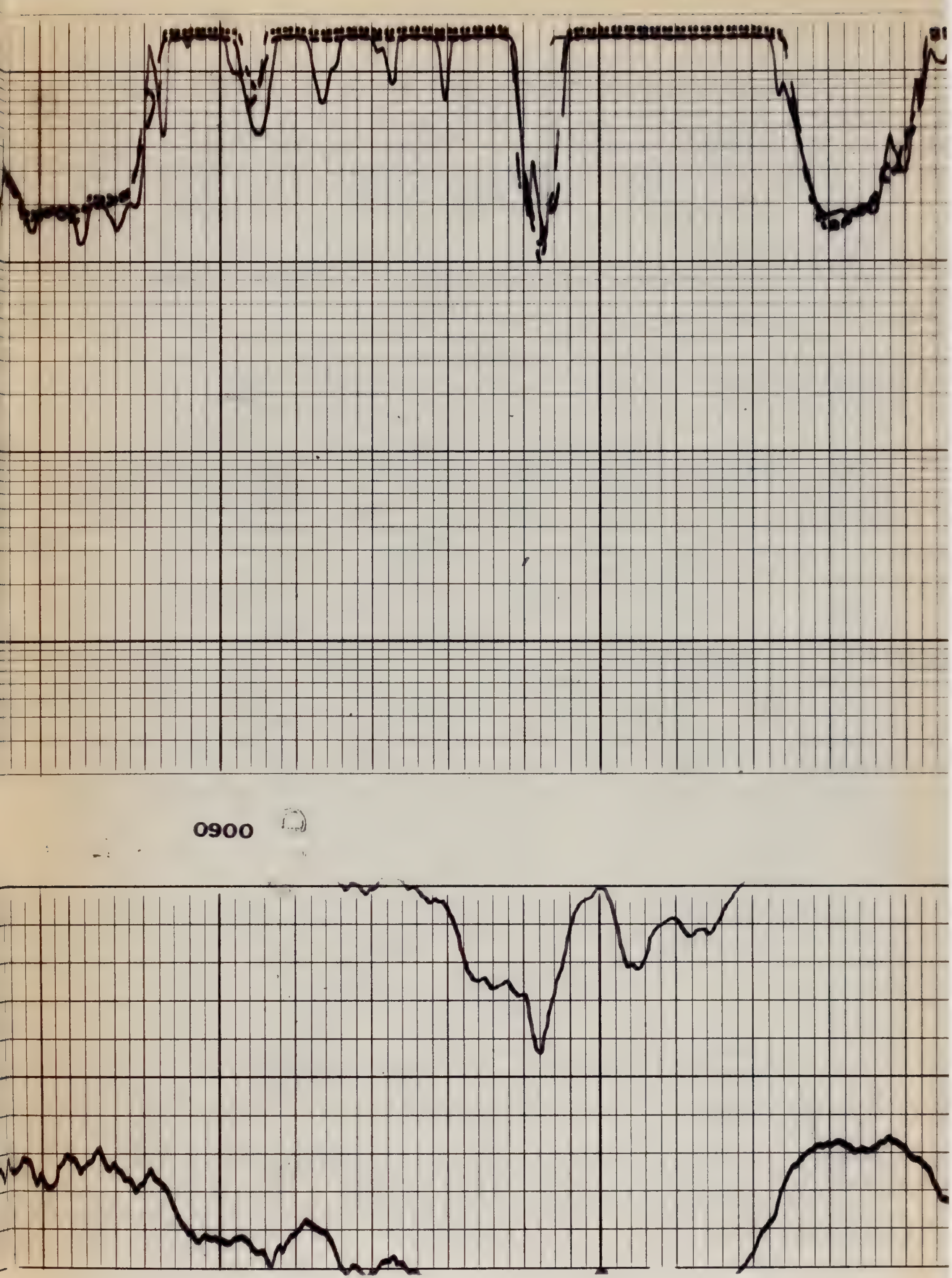
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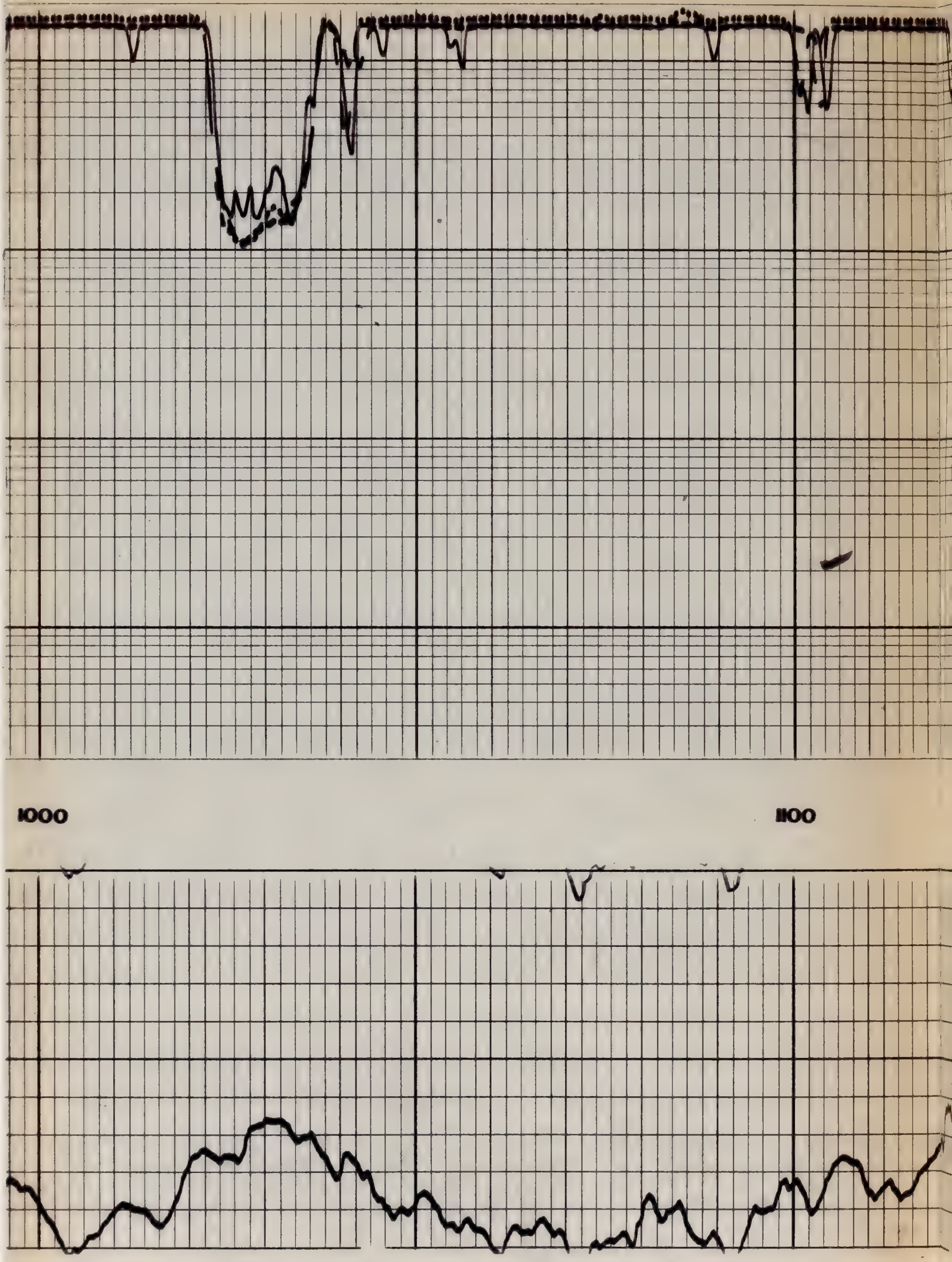
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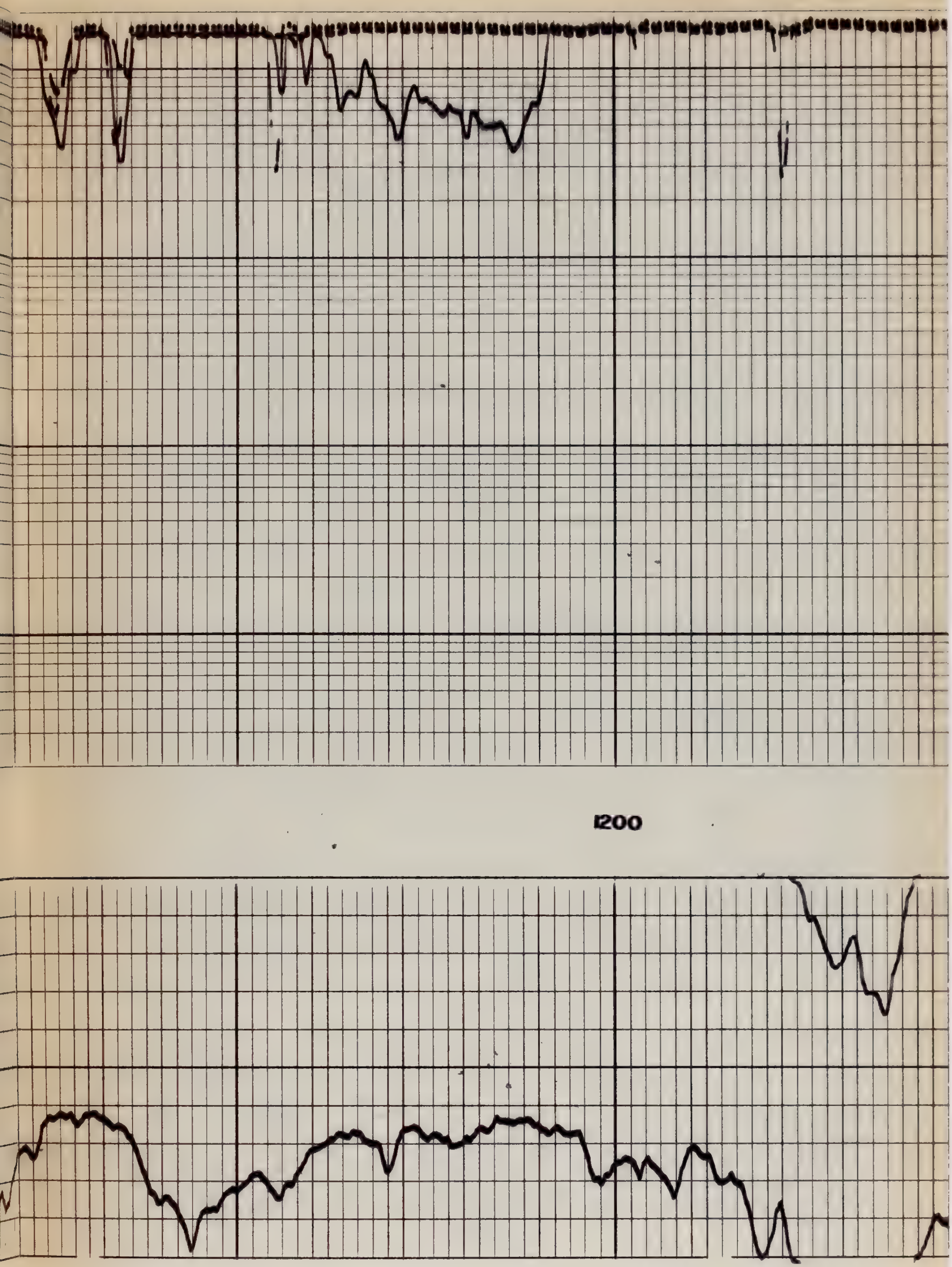
1100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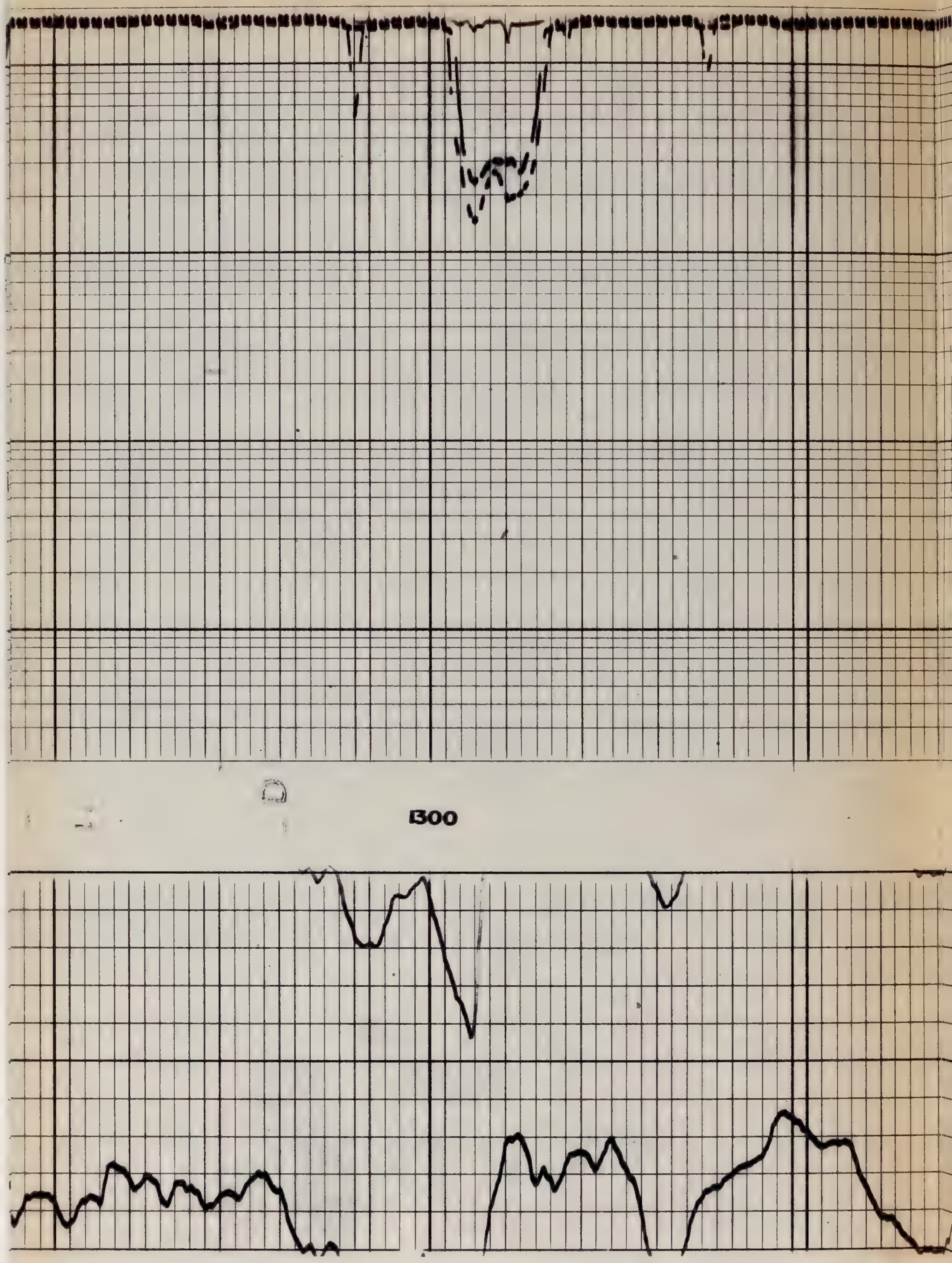
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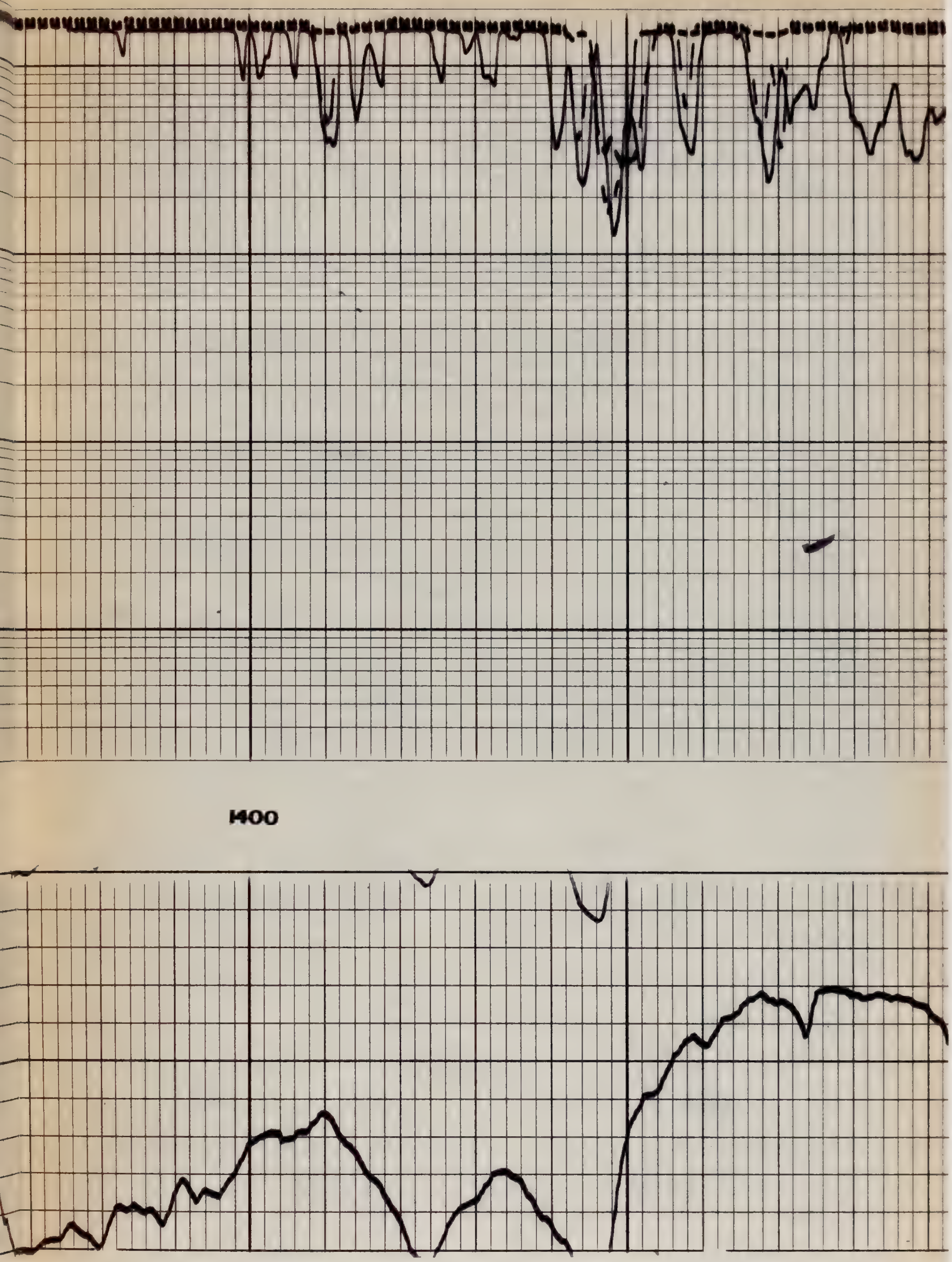
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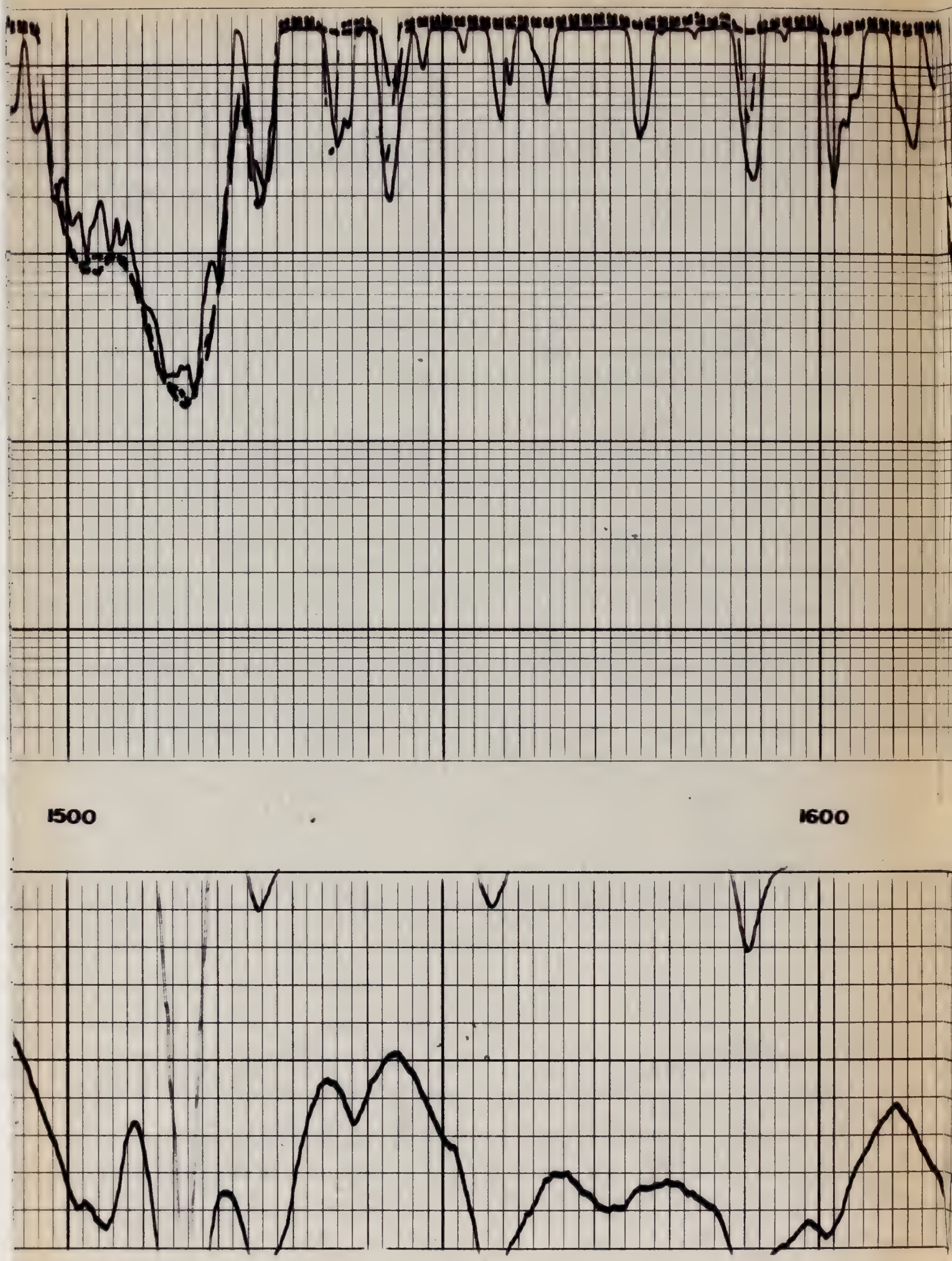
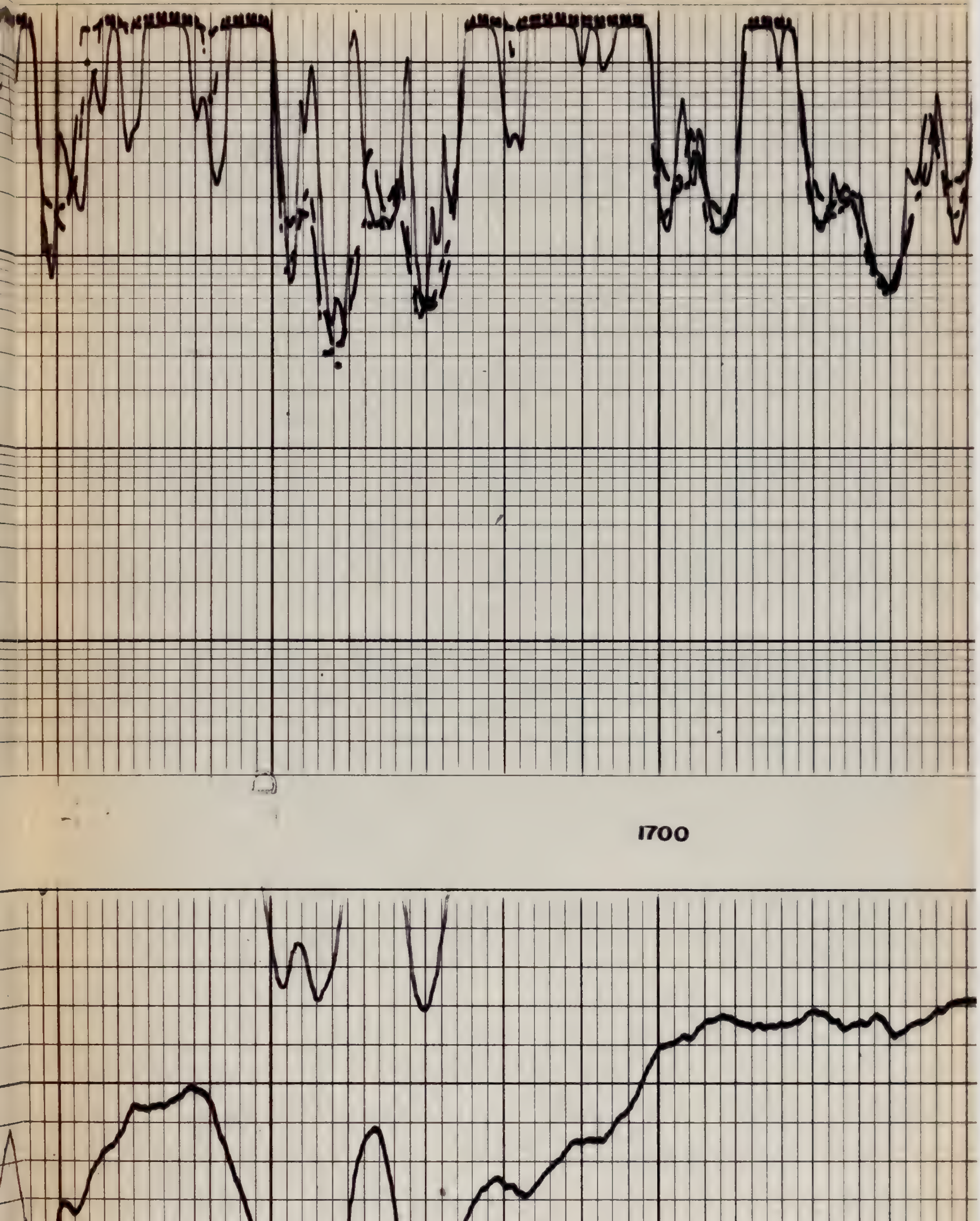
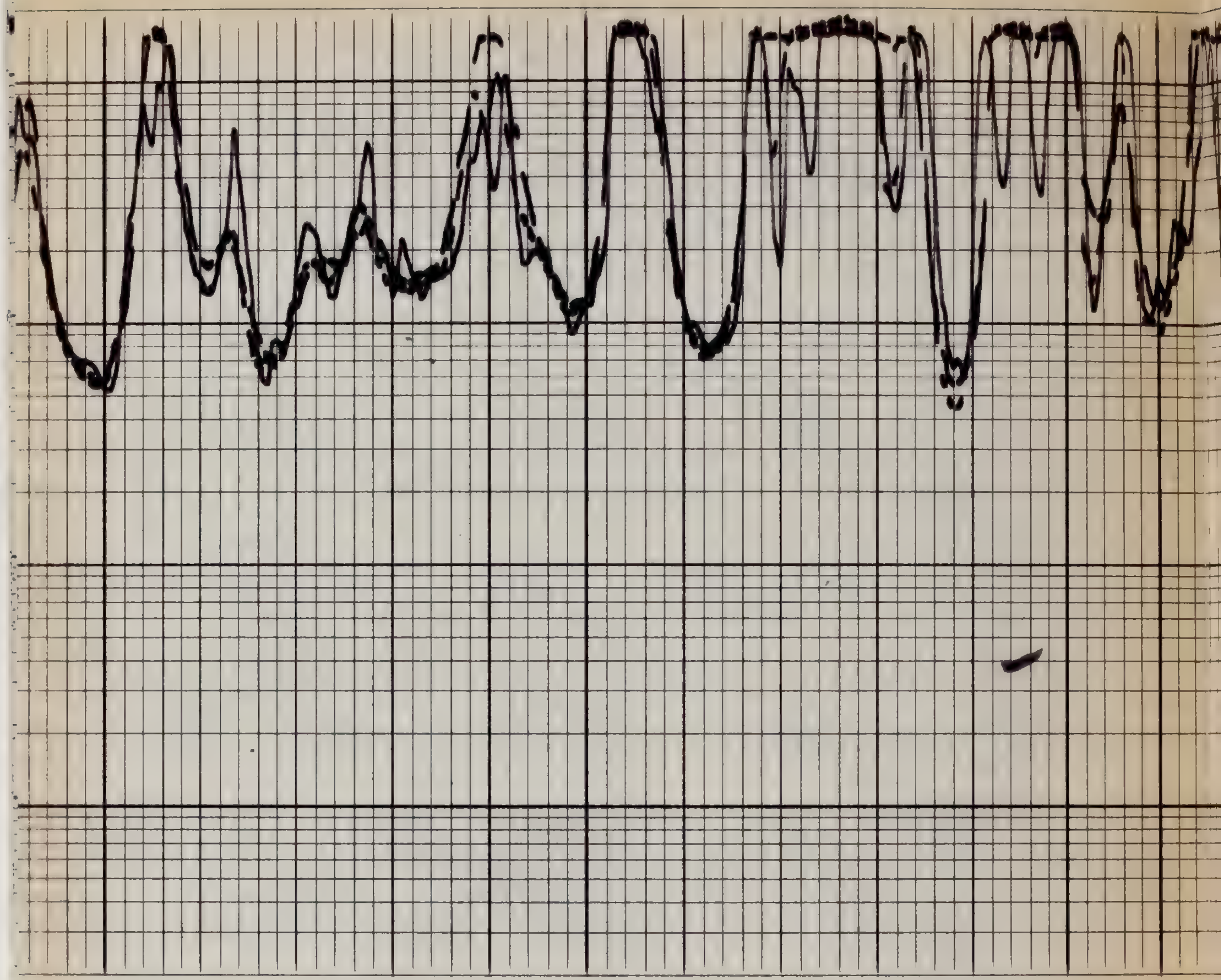
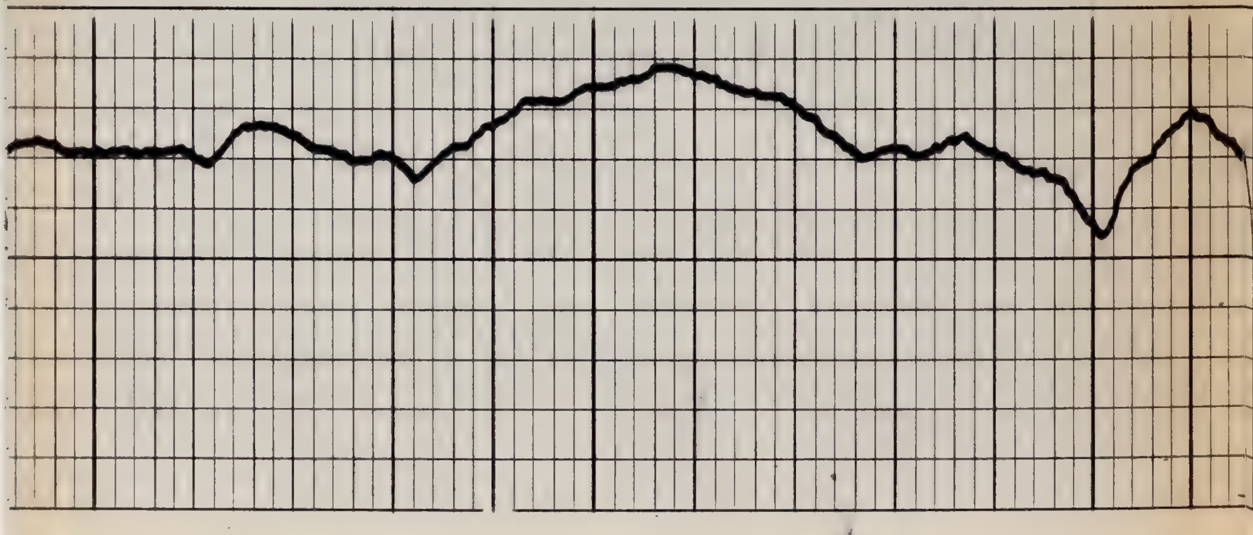
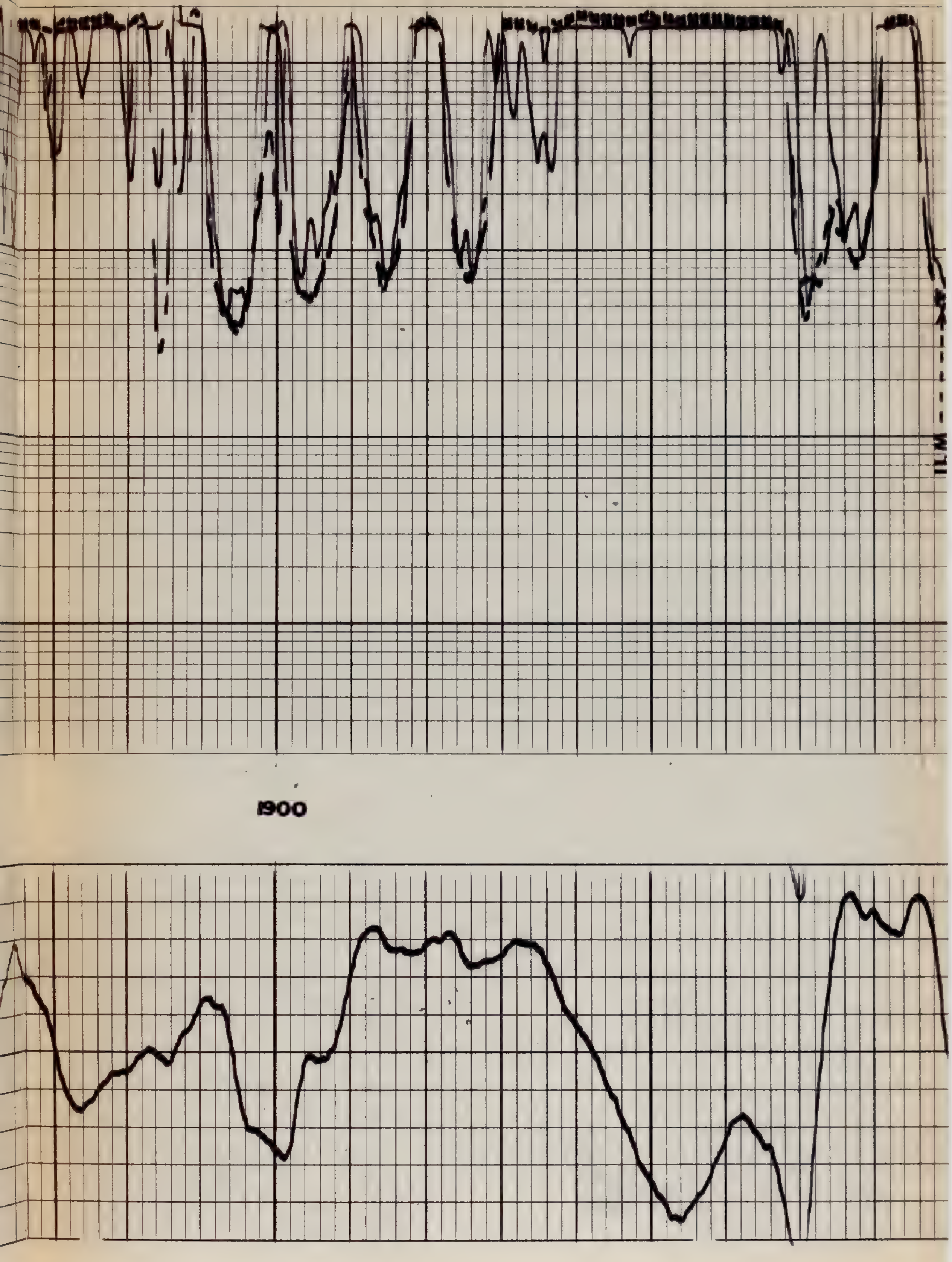

1500
1600

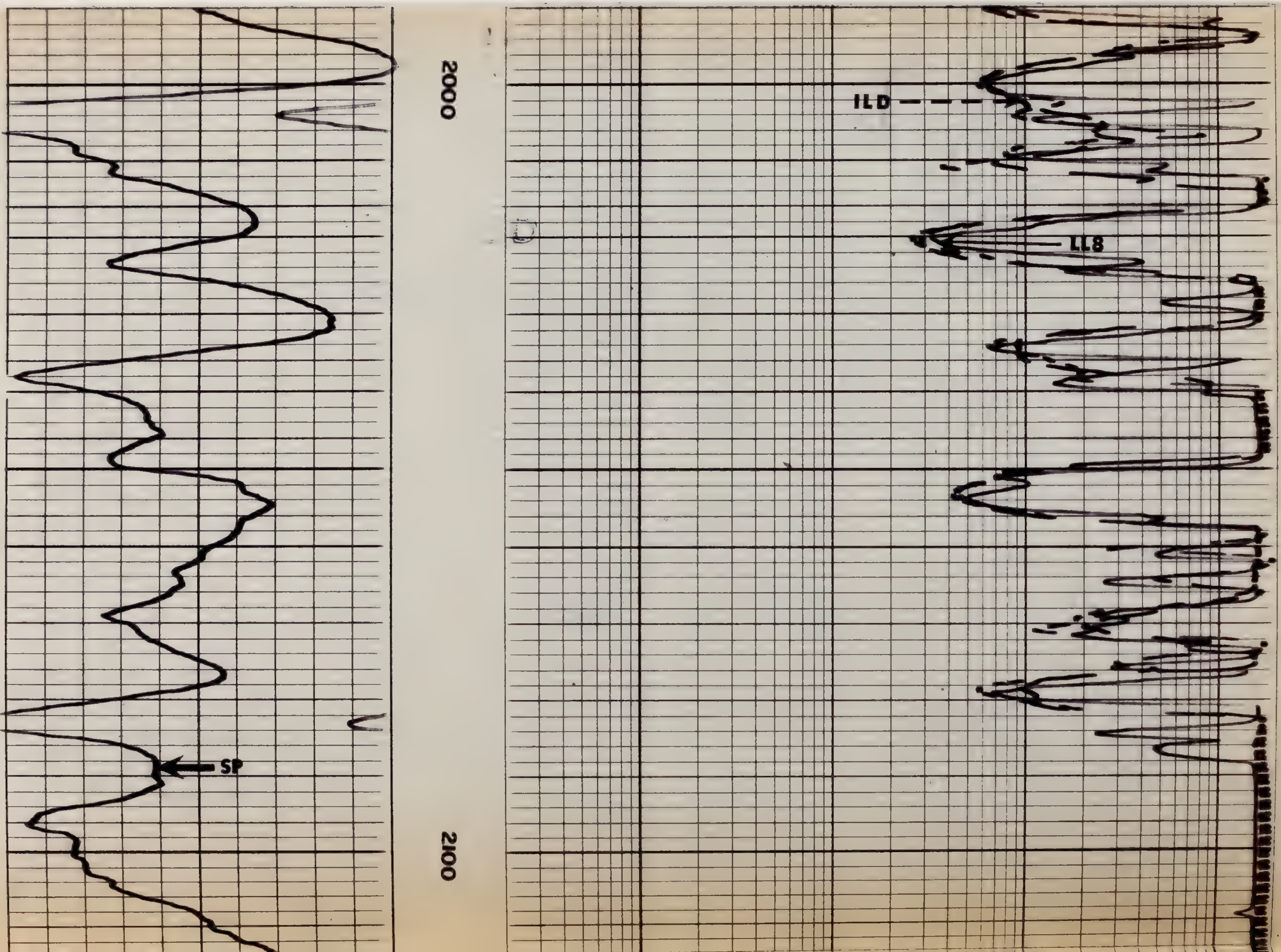

1700

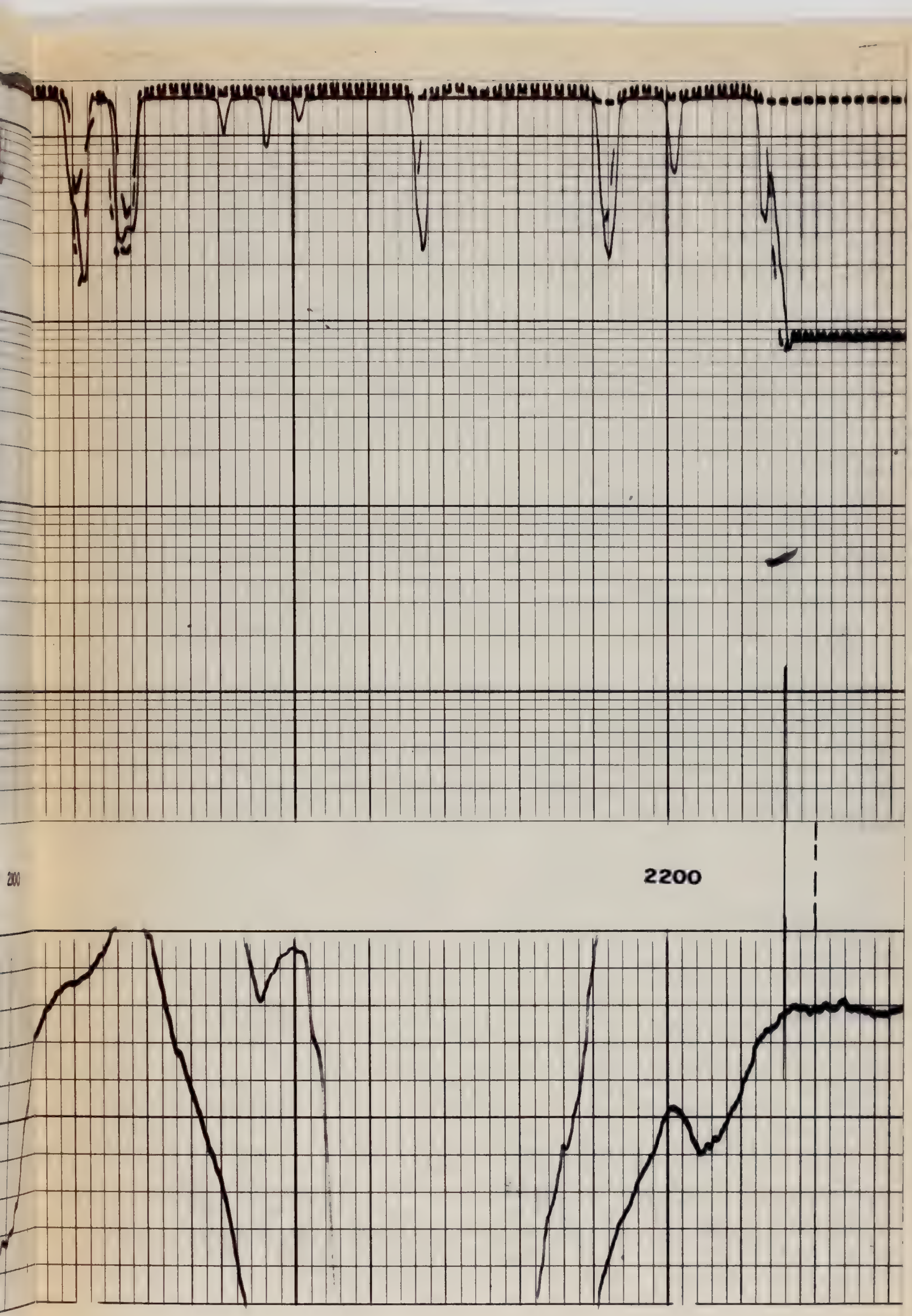


1800




1900
W.11


2000
2100
SP
ILD
LL8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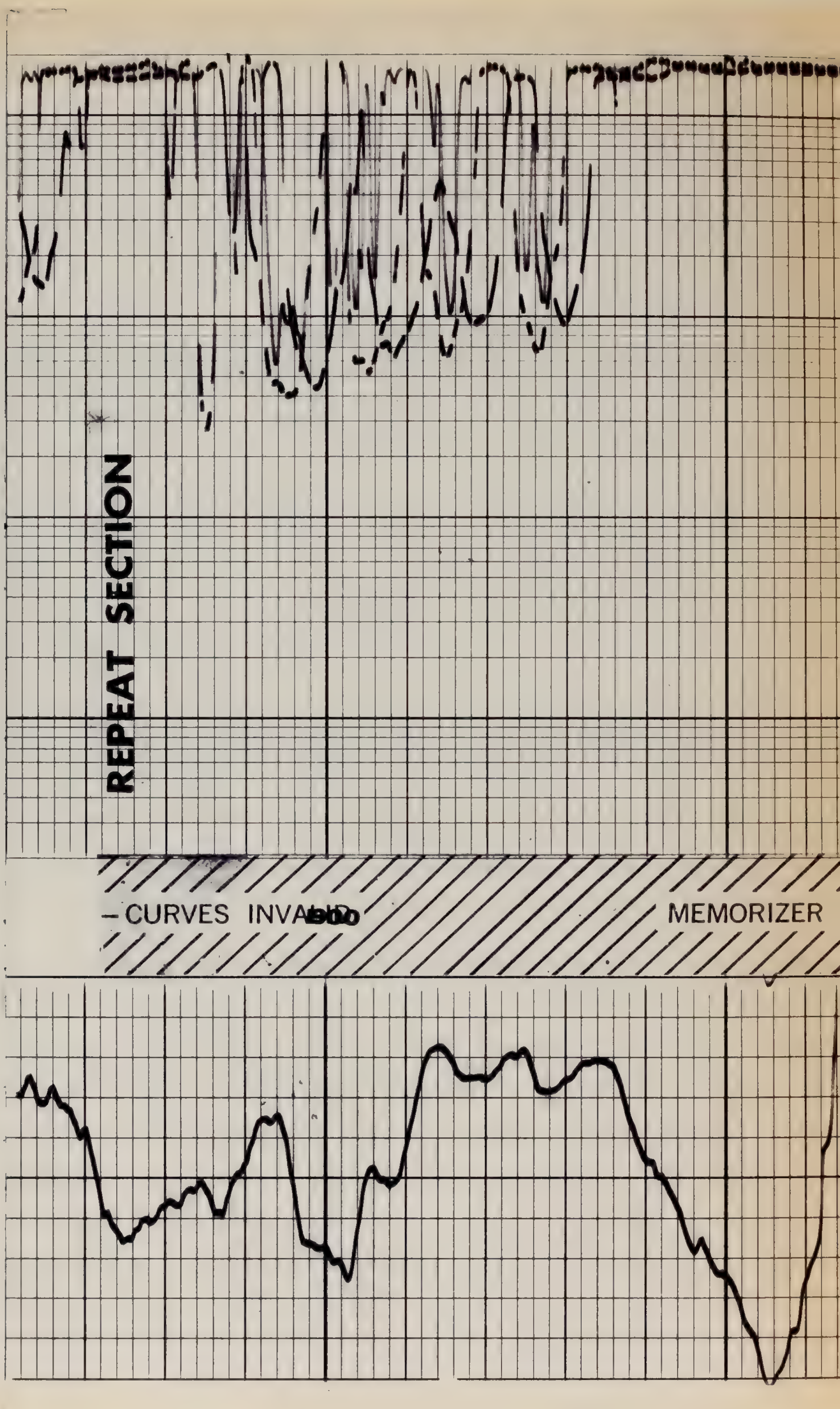
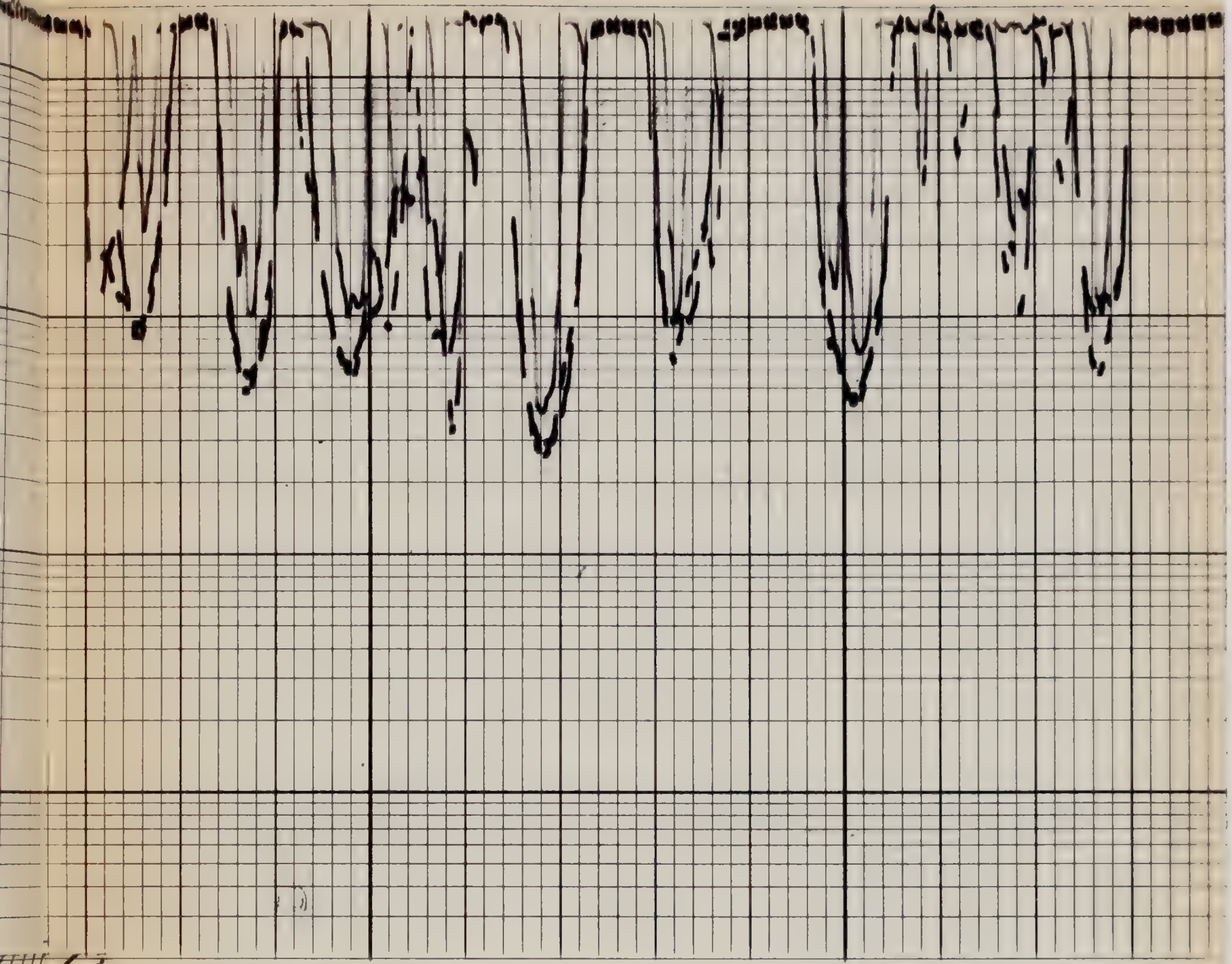
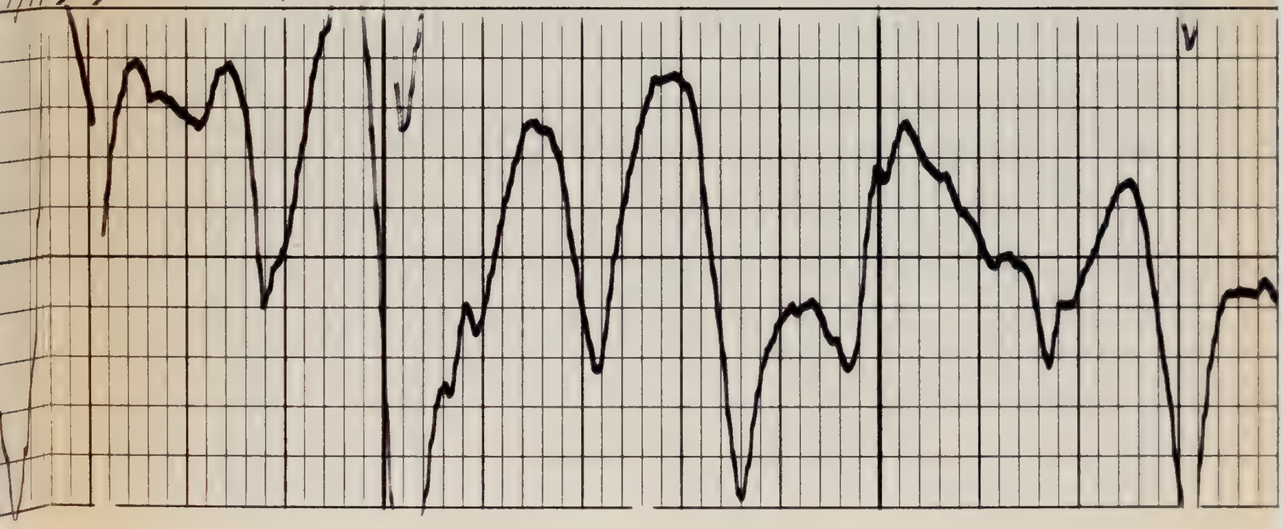
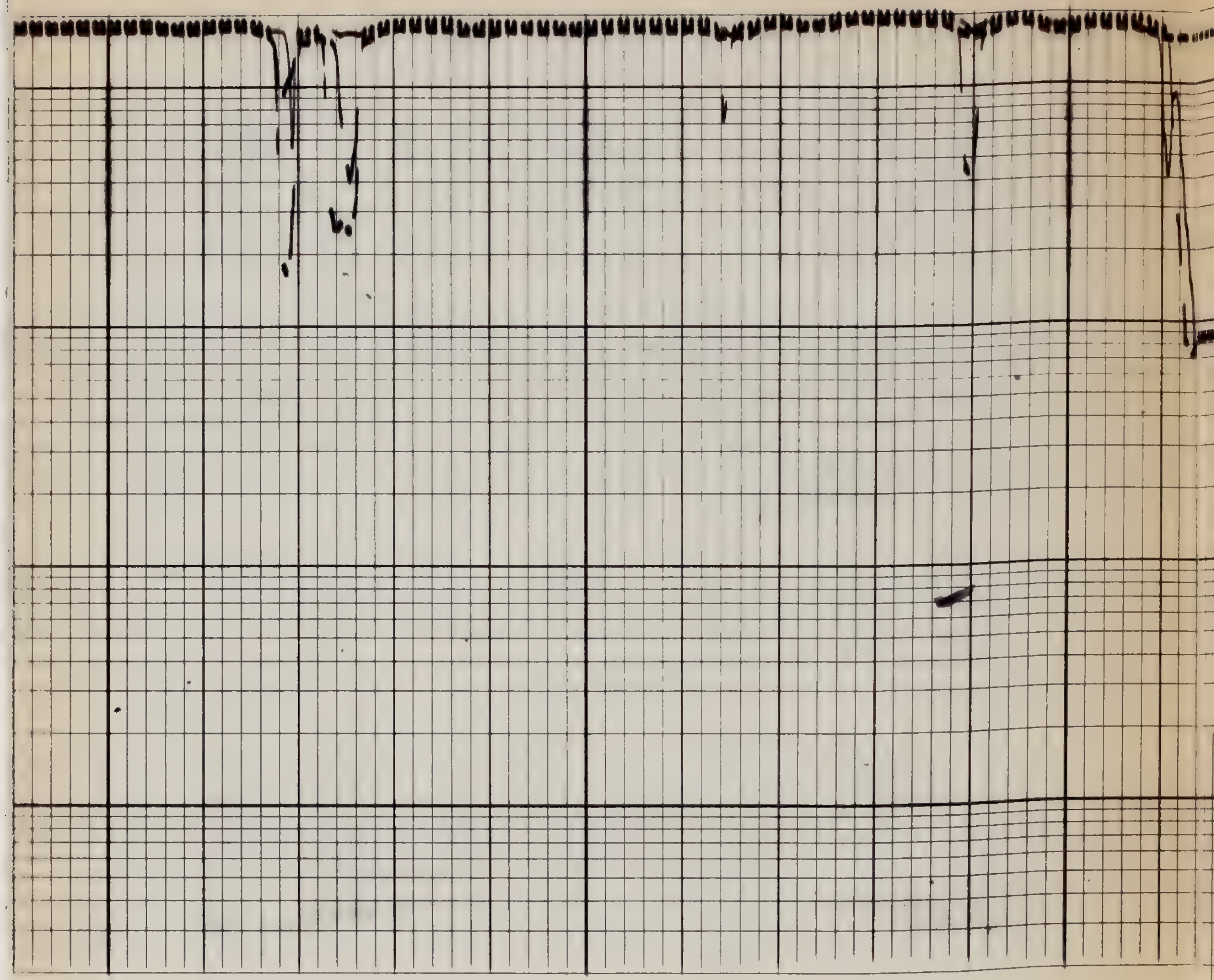

REPEAT SECTION
– CURVES INVALID
500
MEMORIZER

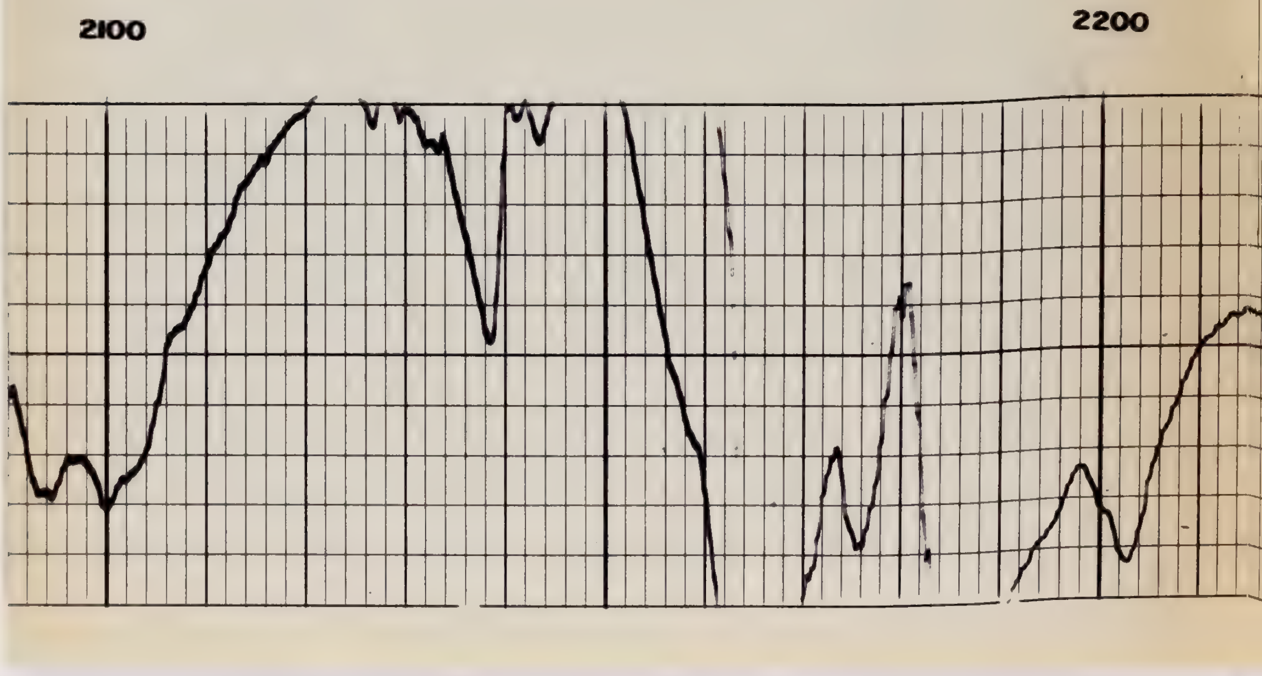


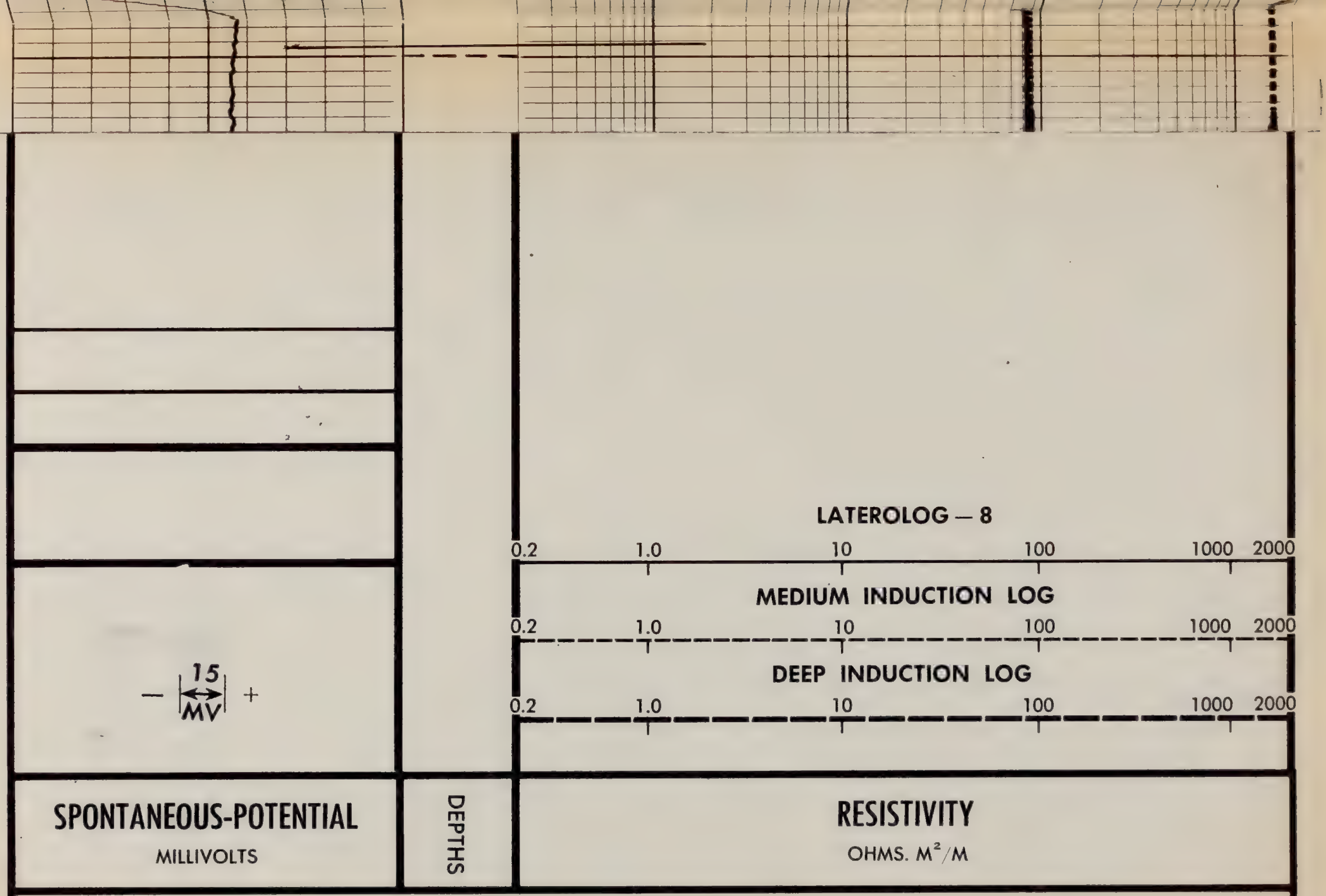
ORIZER OUT

2000






2100
2200



COMPANY THE ATLANTIC RICHFIELD COMPANY

SCHL. FR 2216
SCHL TD 2220

WELL SORGHUM GULCH #6

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

DRLR TD 2220

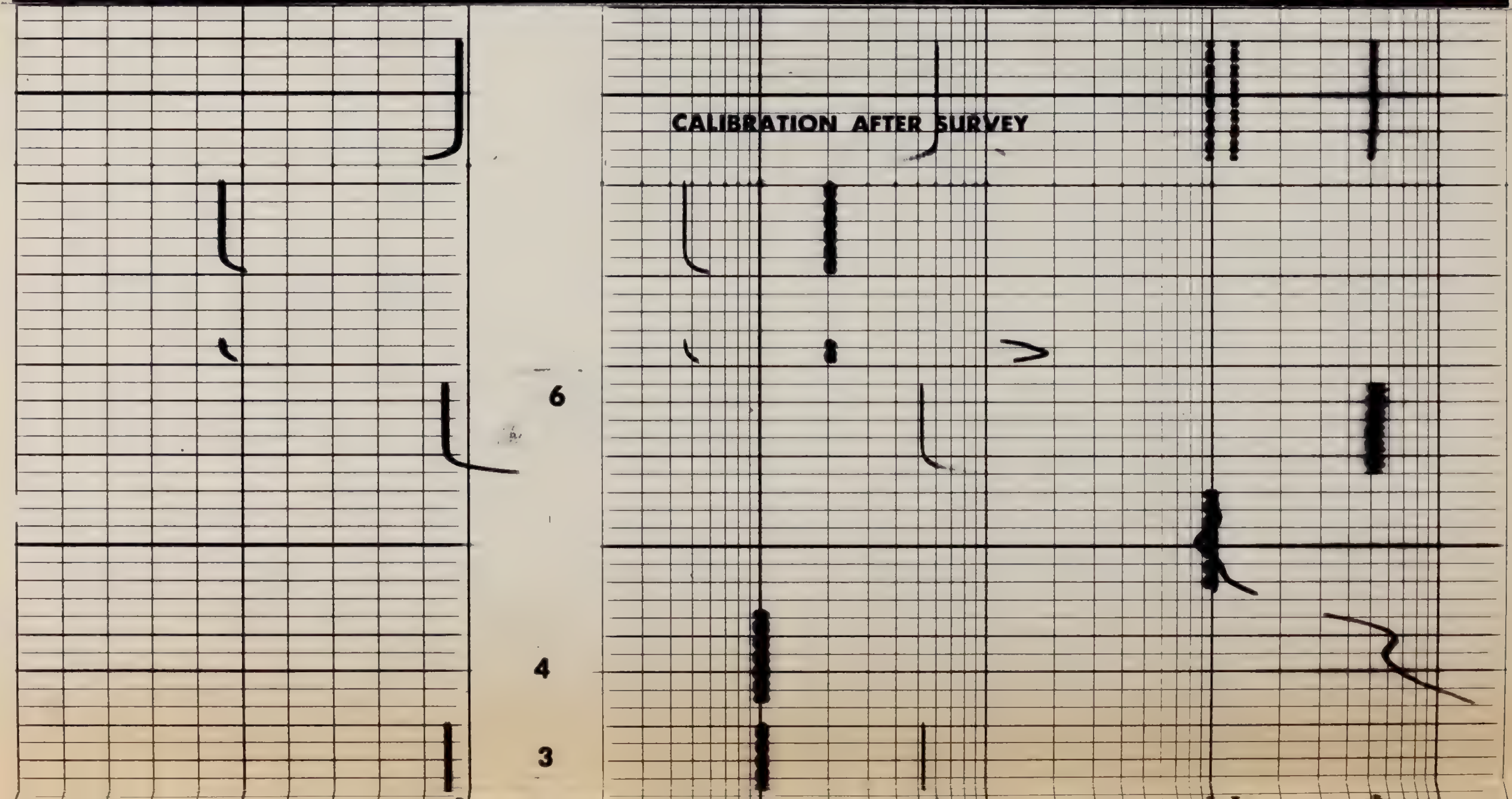
Elev:

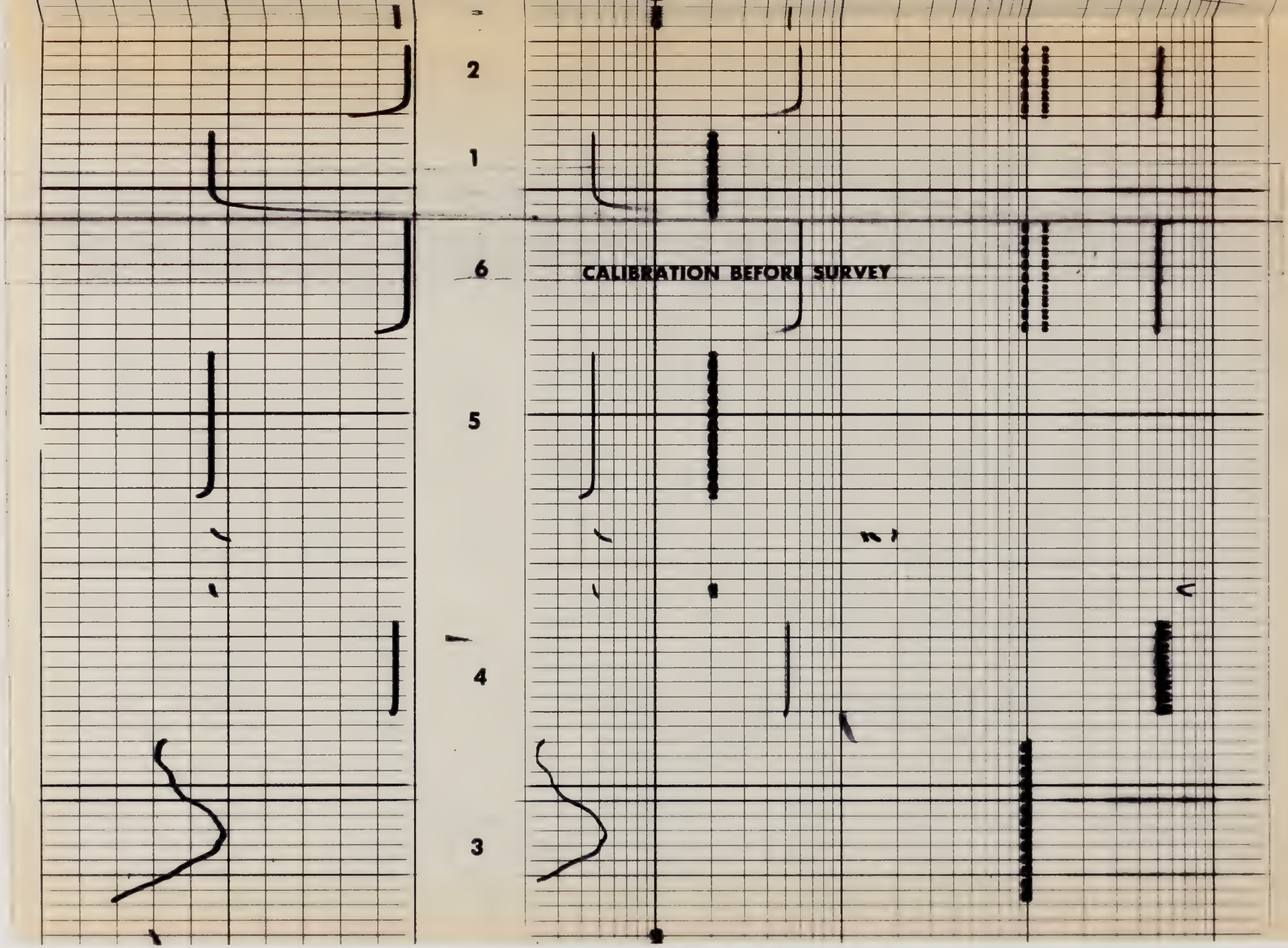
KB

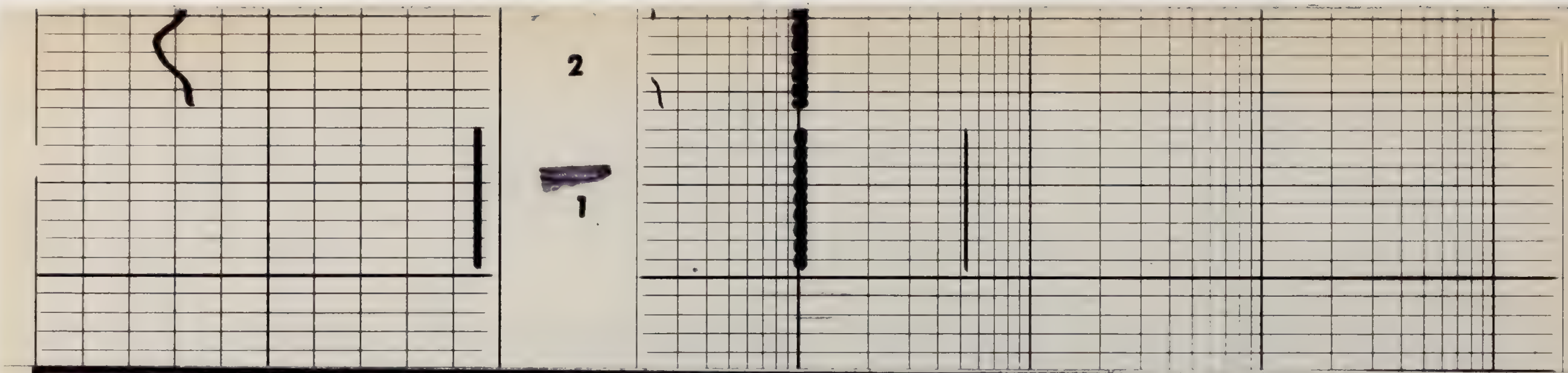
DF

GL 6888

CALIBRATION RECORD




2
1
6
CALIBRATION BEFORE SURVEY
5
4
3



CALIBRATION RECORD

COMPANY THE ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #6

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 2216
SCHL. TD 2220
DRLR TD 2220
Elev:
KB
DF
GL 6888

SWS–1918-B

COUNTY RIO BLANCO, COLO.
FIELD or
LOCATION SORGHUM GULCH

Schlumberger

SIMULTANEOUS

COMPENSATED NEUTRON-FORMATION DENSITY

COUNTY RIO BLANCO, COLO.
FIELD or LOCATION SORGHUM GULCH
WELL SORGHUM GULCH #6
COMPANY ATLANTIC RICHFIELD

COMPANY THE ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #6

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

Location: API Serial No.
2523' FSL & 2251'FWL
Sec. 7 Twp. 3S Rge. 96W

Other Services:
BHC-GR
HRT
DIL

Permanent Datum: GL ; Elev.: 6888
Log Measured From GL , 0 Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B.
D.F.
G.L. 6888

Date	8/23/74			
Run No.	ONE			
Depth—Driller	2220			
Depth—Logger	2220			
Btm. Log Interval	2219			
Top Log Interval	61			
Casing—Driller	8-5/8@ 59	@	@	@
Casing—Logger	61			
Bit Size	6-1/4			
Type Fluid in Hole	WATER			
Fluid Level	440			
Dens. Visc.				
pH Fluid Los	ml	ml	ml	ml
Source of Sample	PIT			
R_{mm} @ Meas. Temp.	5.04 @88 °F	@ °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
R_{mc} @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
Source: R_{mf} R_{mc}				
R_m @ BHT	@ °F	@ °F	@ °F	@ °F
Time Since Circ.	18 HOURS			
Max. Rec. Temp.	110 °F	°F	°F	°F
Equip. Location	5602 GJ			
Recorded By	BARGHOUTI			
Witnessed By	ELLARD·TAIT			

The well name, location and borehole reference data were furnished by the customer.

FOLD HERE

The well name, location and borehole reference data were furnished by the customer.

CHANGES IN MUD TYPE OR ADDITIONAL SAMPLES

Date	Sample No.			
Depth - Driller				
Type Fluid				
Source of Sample				
Rm @ Meas. Temp.	@ °F		@ °F	
Rmf @ Meas. Temp.	@ °F		@ °F	
Rmc @ Meas. Temp.	@ °F			
Rm @ BHT	@ °F			
Dens.	Visc.			
ph	Fluid Loss	ml		ml
% Water by Vol.				
% Oil by Vol.				
% Solids by Vol.				
Solids Av. Sp. Gr.				

EQUIPMENT DATA

Run No.	ONE			
Dens. Pnl.	EA-273			
Dens. Cart	EA-299			
Dens. Skid	D-688			
Dens. Sde	E-90			
Dens. Source	B-2043			
Dens. Calib.	210			
Neut. Pnl.	A-205			
Neut. Cart	A-199			
Neut. Source	FA-255			
Neut. Calib	E-206			
GR Cart	JA-284			
TTR				
Mem Pnl.	B-238			

BIT SIZE CASING DATA

Bit	From	To	Csg. Size	Csg. Wt.	From	To
-1/4	CSG	TD	8-5/8		SURF	59

SCALE CHANGES

Type Log	Depth	Scale Up Hole	Scale Down Hole

LOGGING DATA

CNP

Matrix	Auto Hole Size Corr.	Hole Size Setting (if not auto)	Porosity Scale	From	To
LIMESTONE	☒ Yes ☐ No		60-0	TD	FL
	☐ Yes ☐ No				
	☐ Yes ☐ No				
	☐ Yes ☐ No				
	☐ Yes ☐ No				

FDC

Liquid Density	Grain Density	Hole Fluid	Porosity Scale	From	To
1.00	2.71	LIQUID	60-0	TD	FL
.90	2.71	AIR	60-0	FL	CSG.

REMARKS

Service Order No. - 15133

CALIBRATION DATA

CALIBRATION DATA

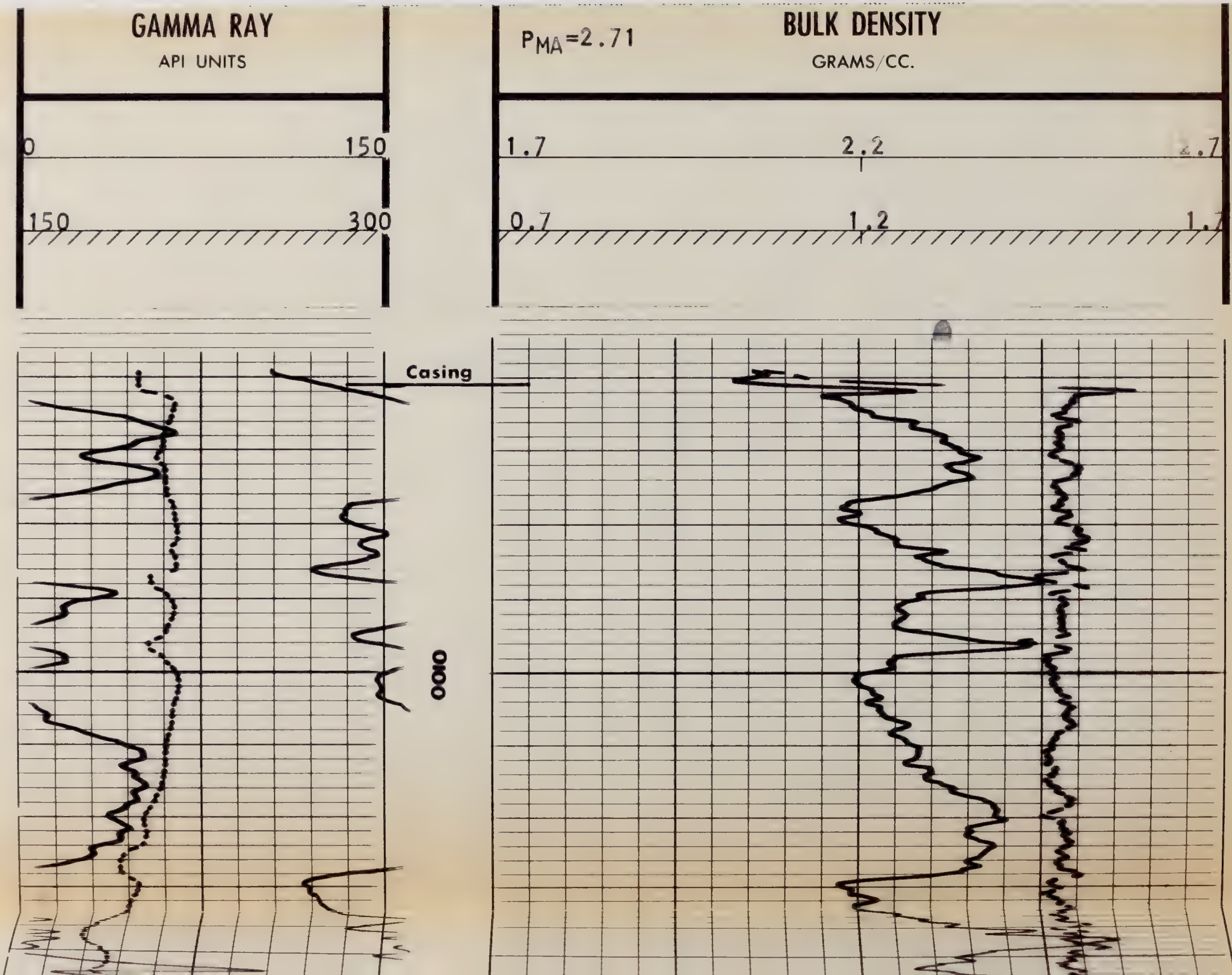
Run	Gamma Ray			CNL—Before Log—ACPS		CNL—After Log—ACPS	
No.	API Scale	Background CPS	Total CPS	Long Spacing	Short Spacing	Long Spacing	Short Spacing
1	0-150	140	610	119	273	119	273
2							
3							
4							
				FDC — Before Log — ACPS		FDC — After Log — ACPS	
1				P_1	P_2	P_1	P_2
2				520	720	520	720
3							
4							

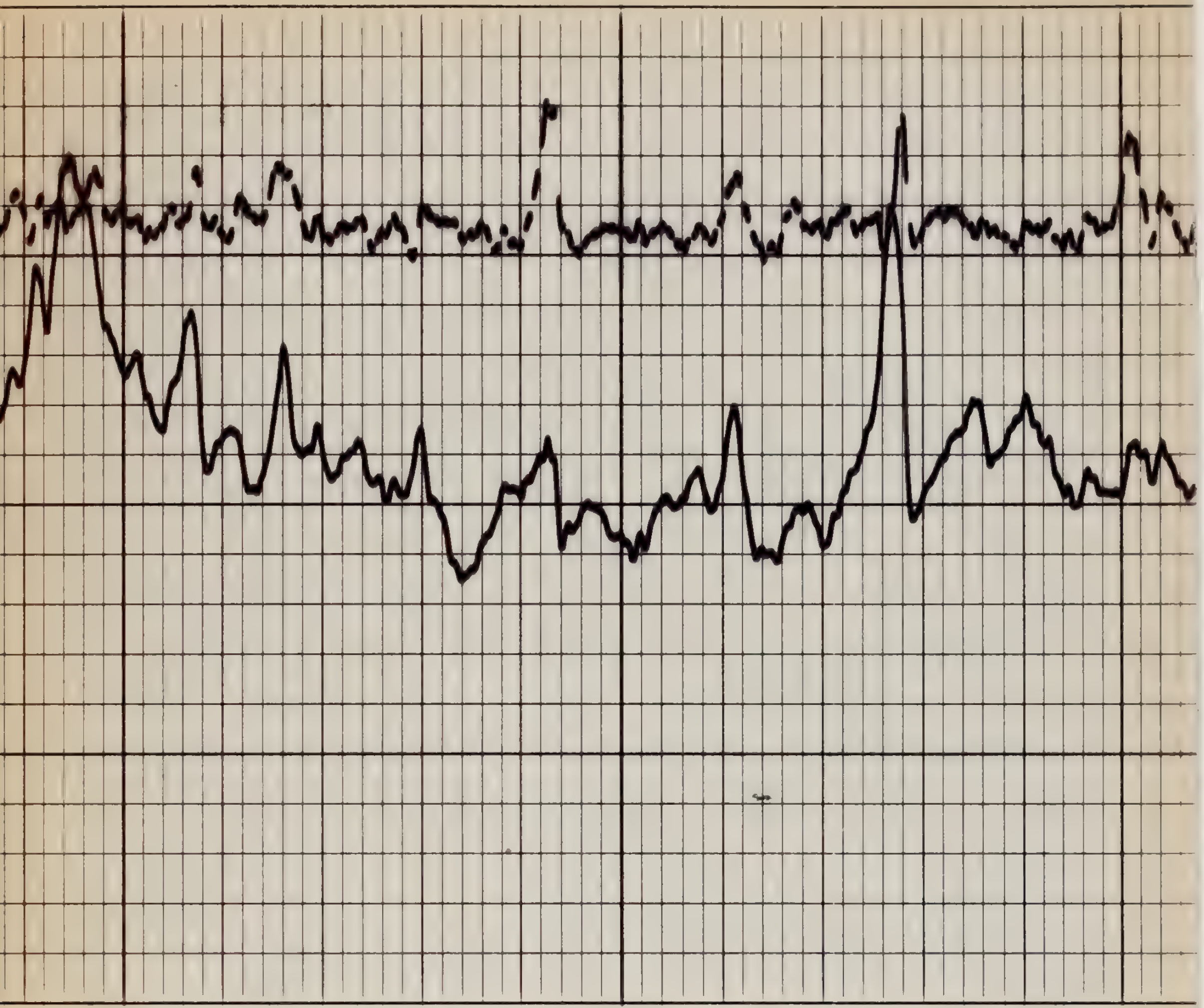
All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to Clause 7 of our General Terms and Conditions as set out in our current Price Schedule.

DETAIL LOG

" = 100'

CALIPER HOLE DIAM. IN INCHES	DEPTHS	CNL RATIO
5" 15"		3.0 2.5 0 —.25 0 +.25 **CORRECTION** GRAMS/CC.


GAMMA RAY
API UNITS
0
150
150
300
P_{MA}=2.71
BULK DENSITY
GRAMS/CC.
1.7
2.2
2.7
0.7
1.2
1.7
Casing
0100



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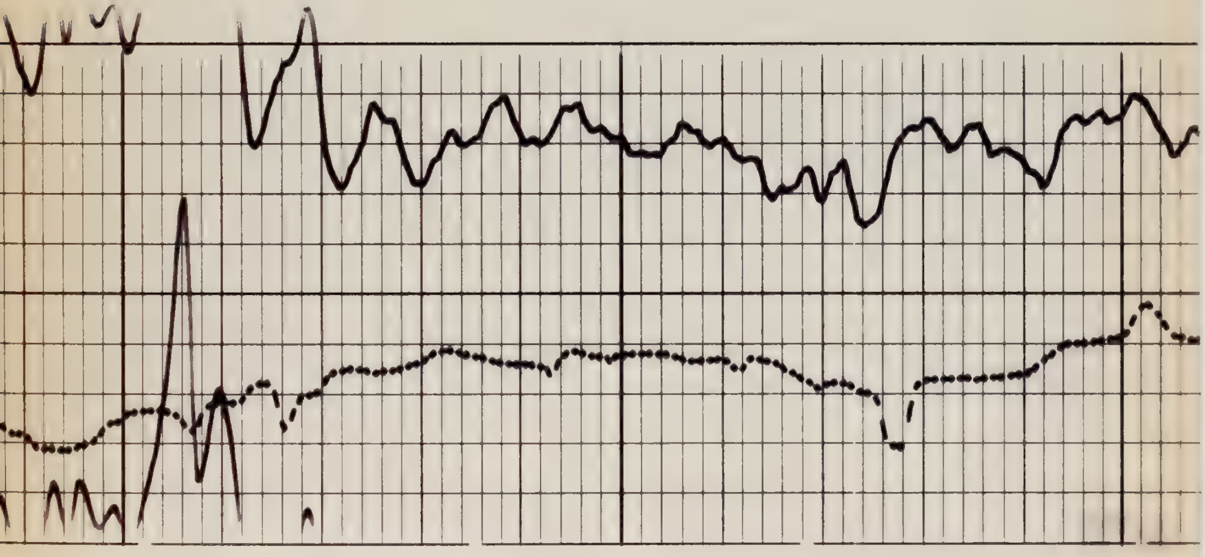
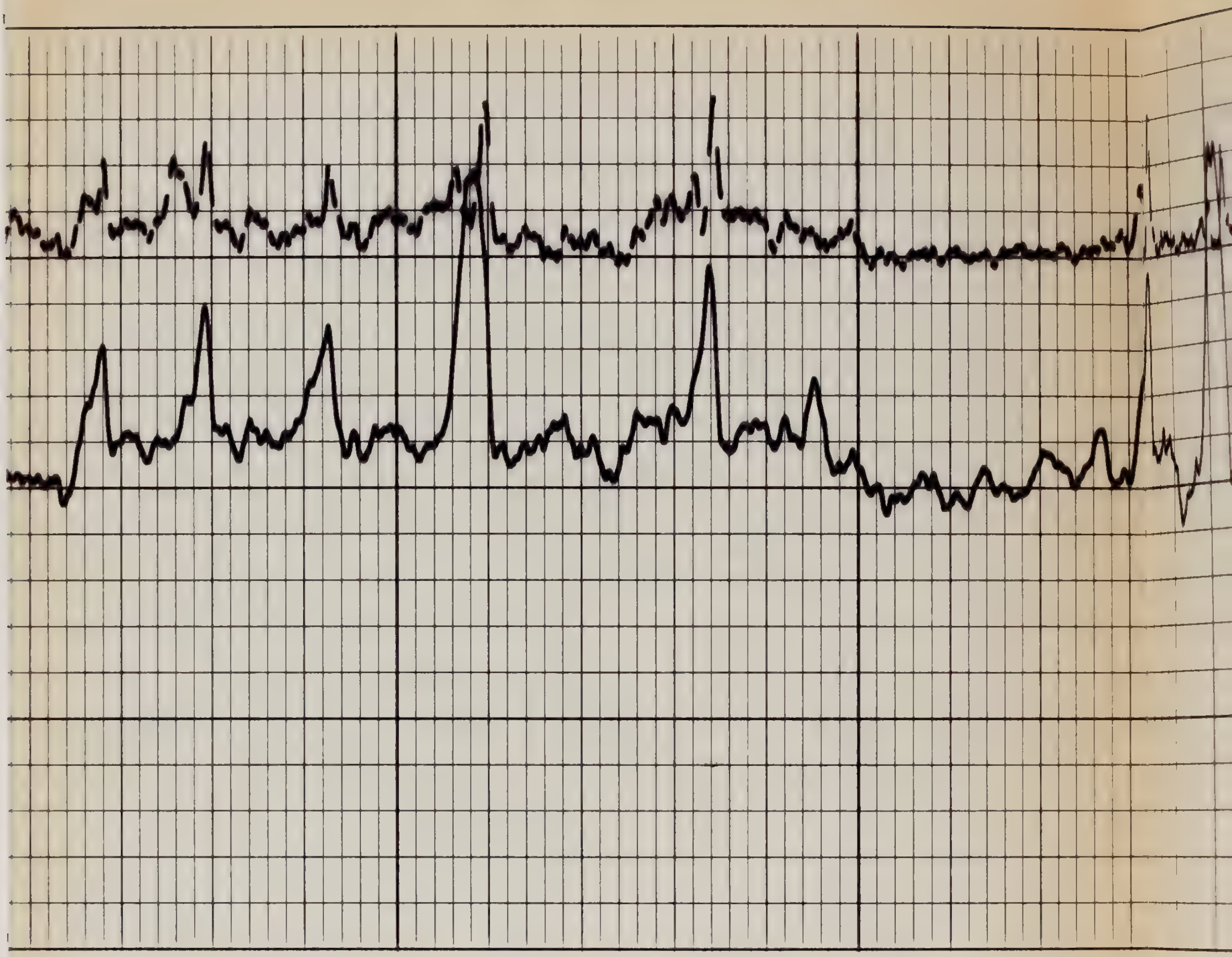
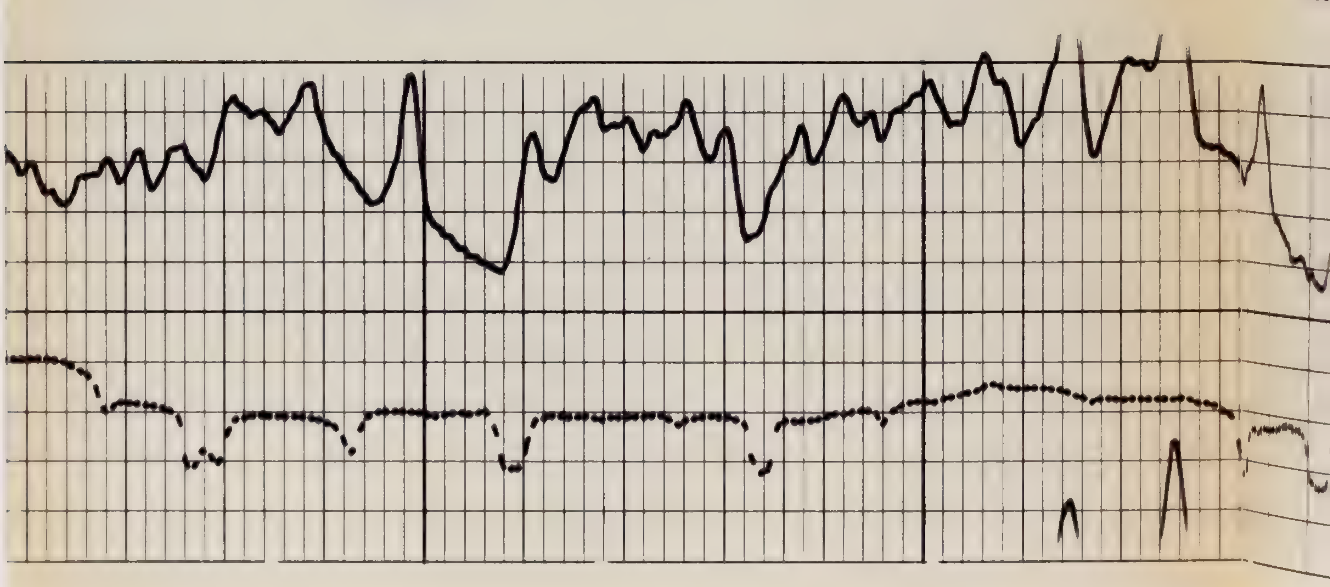
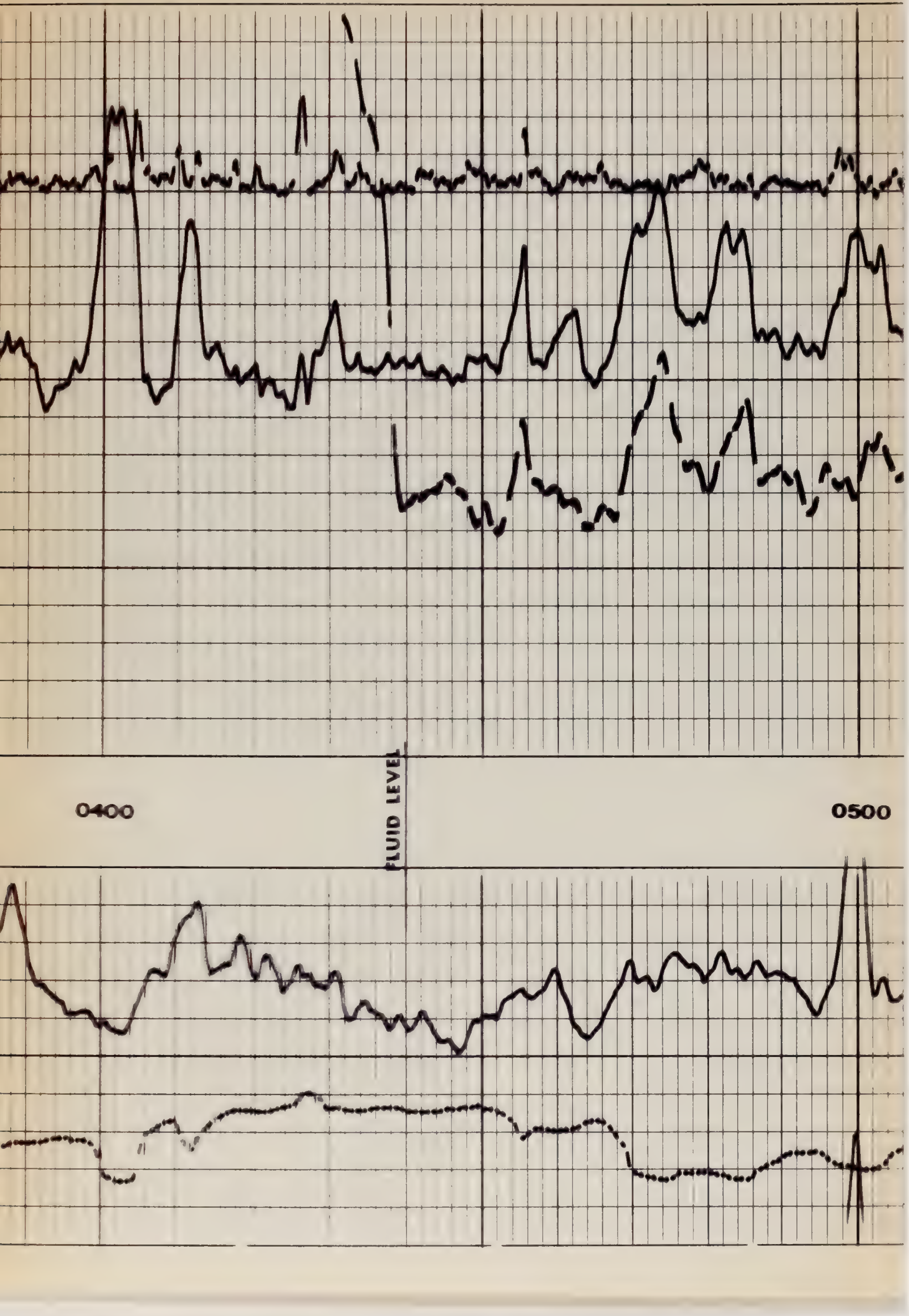
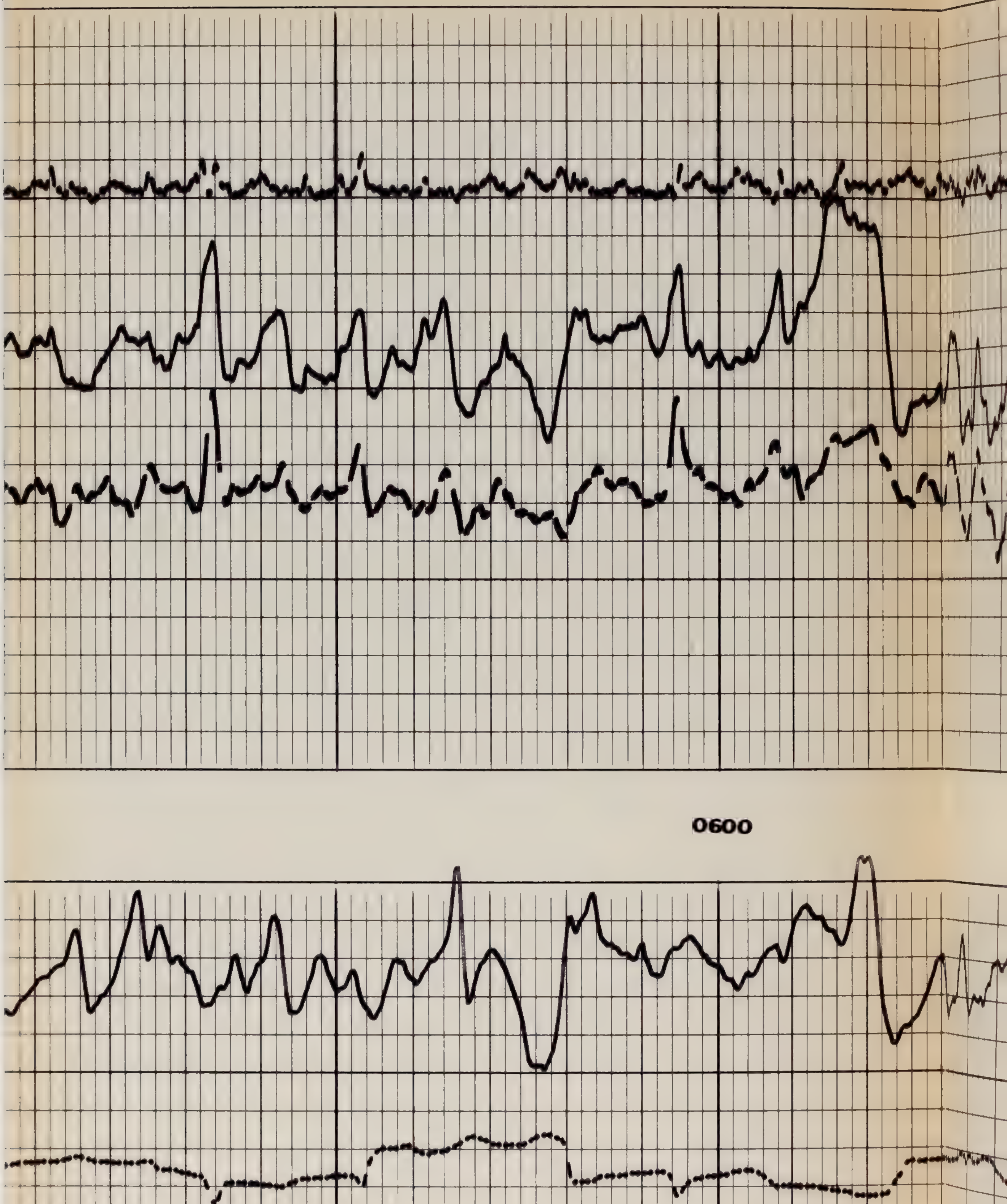




0300
0400




0400
FLUID LEVEL
0500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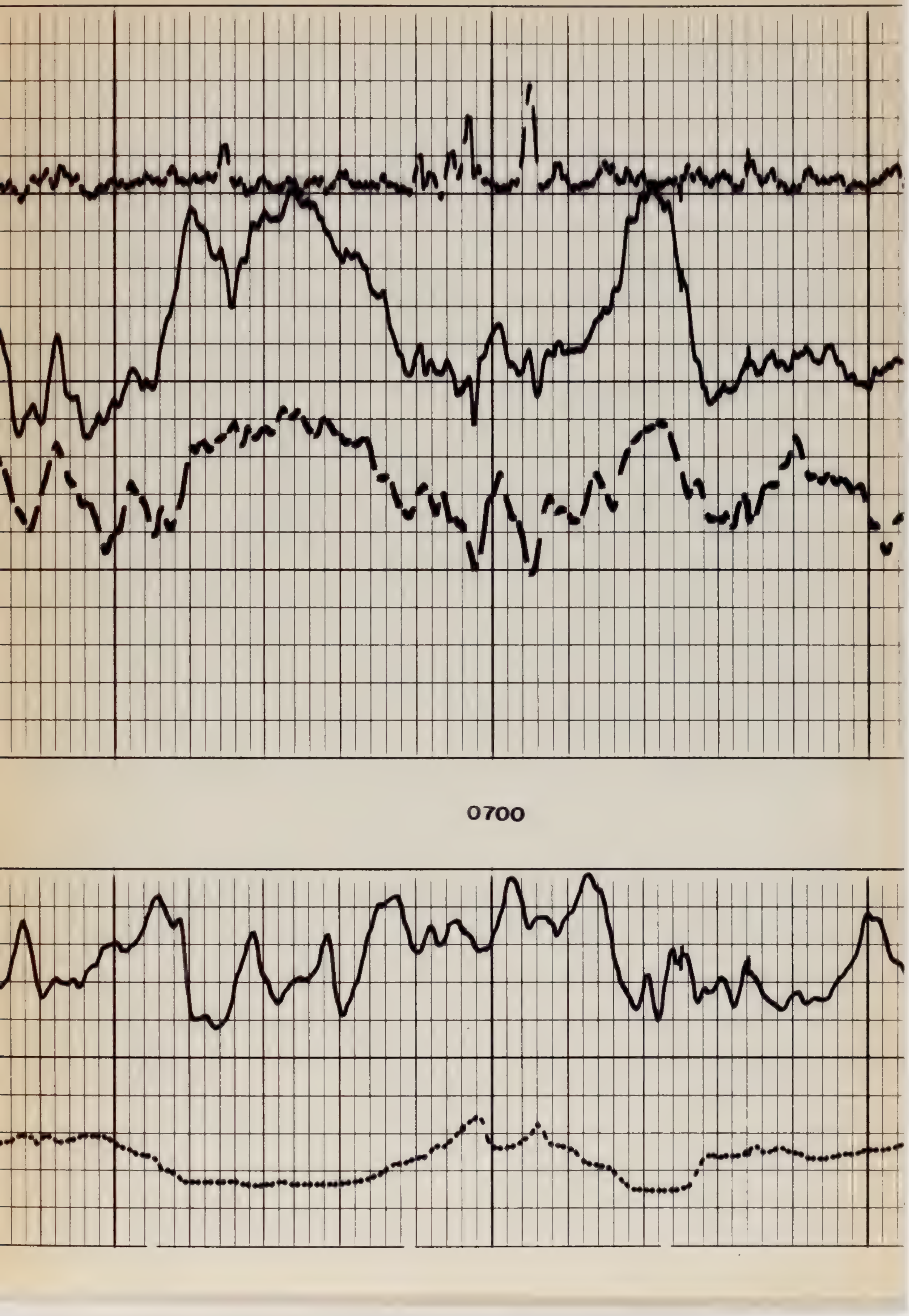
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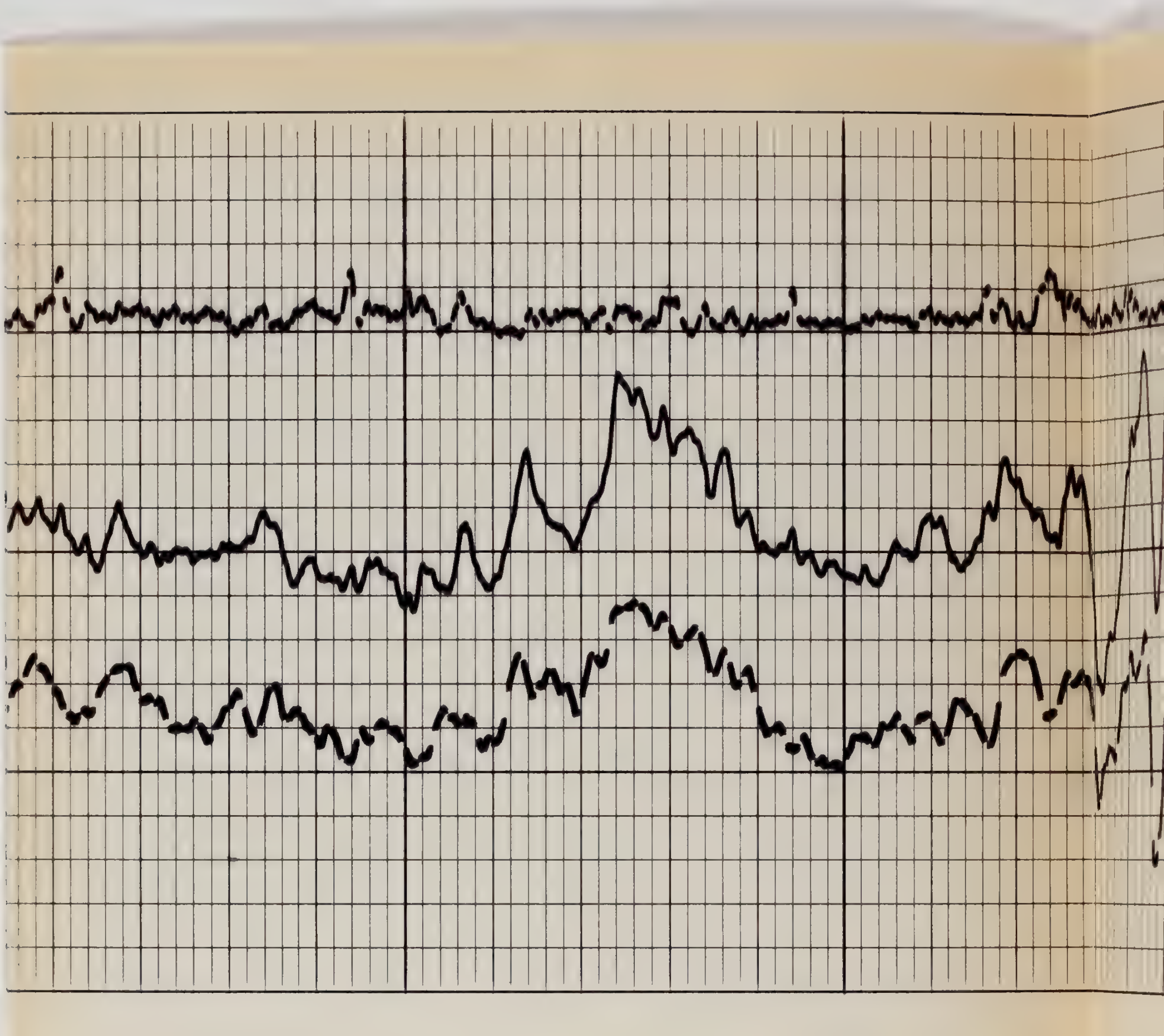
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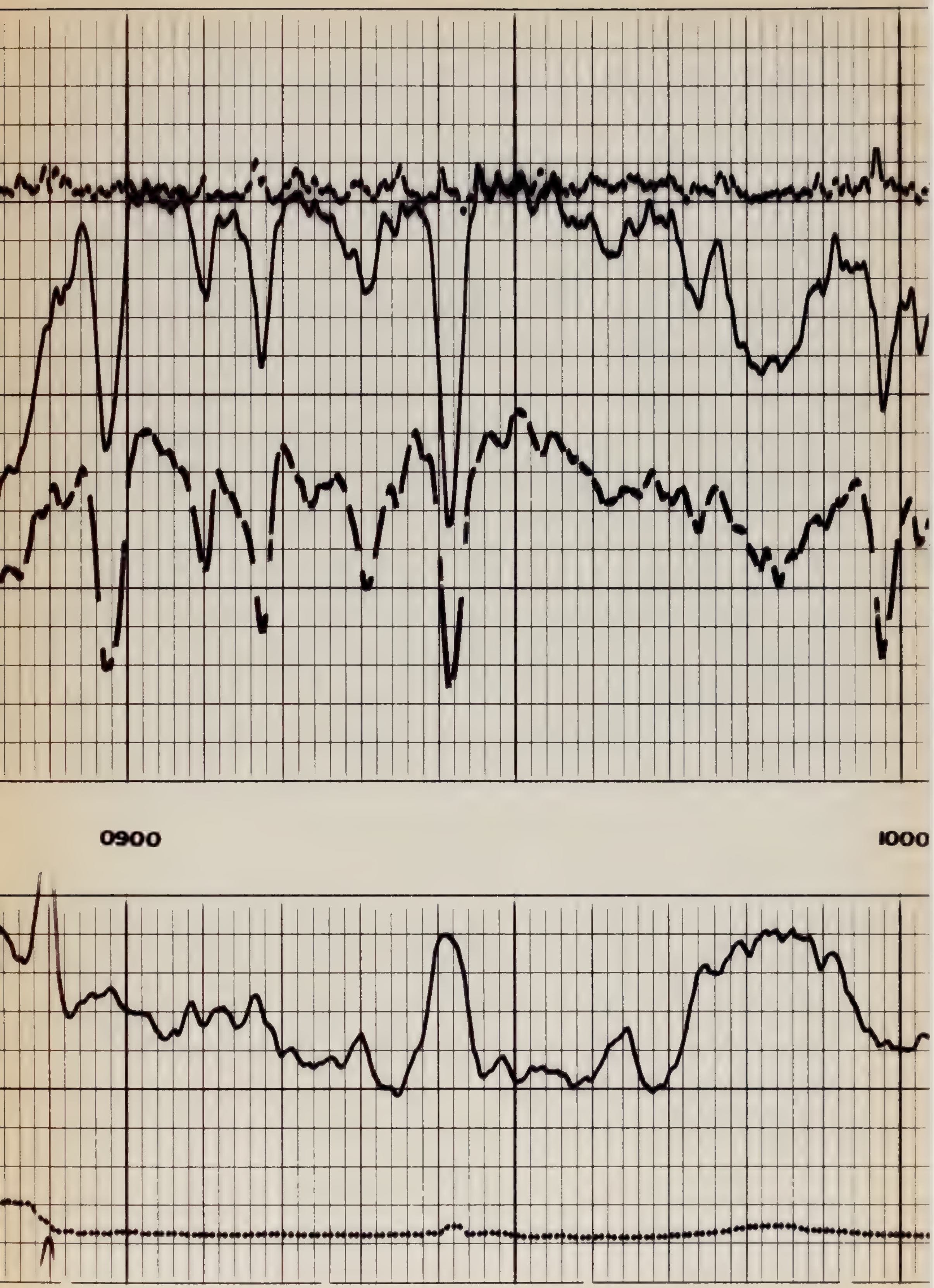
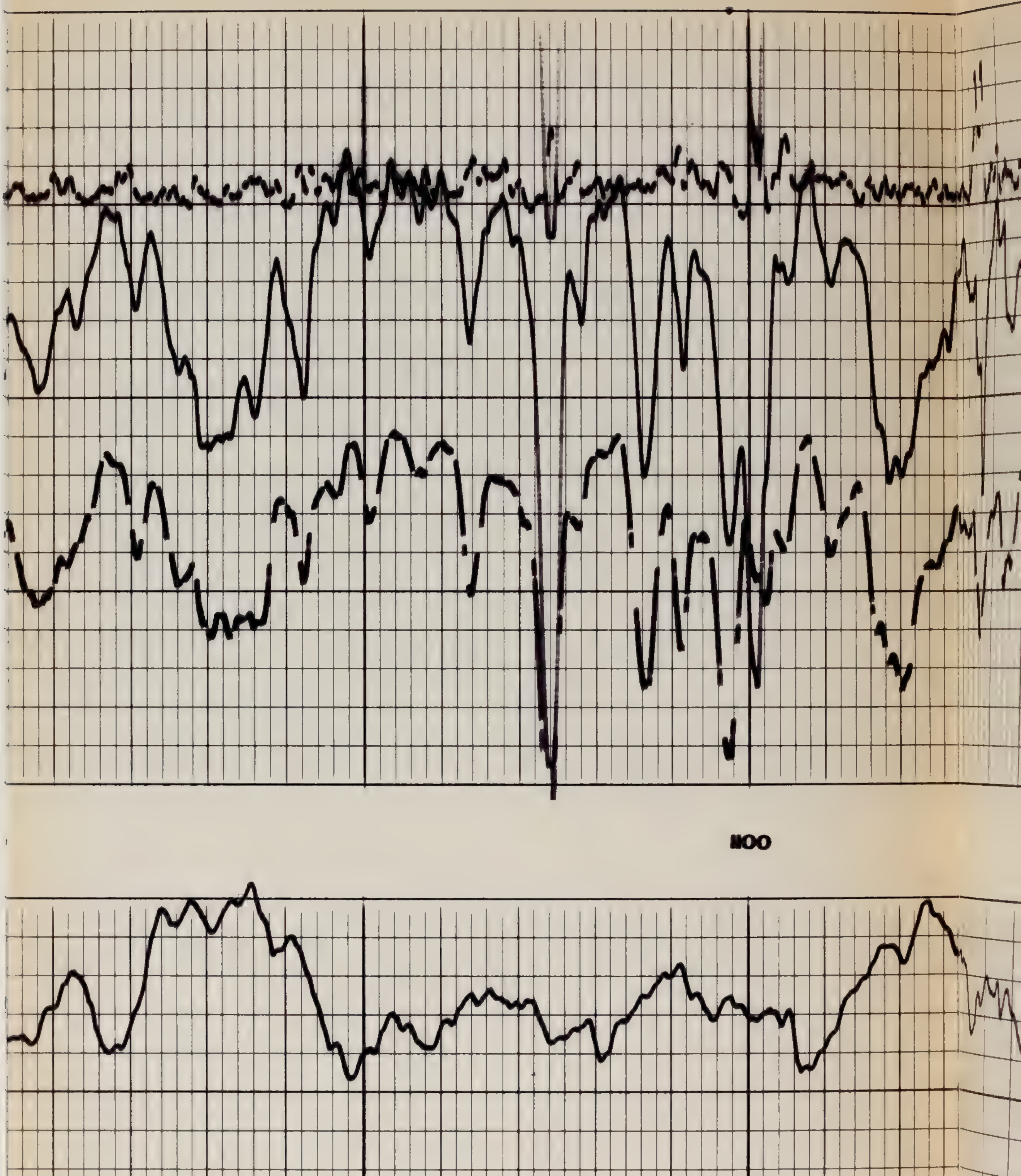

0900
1000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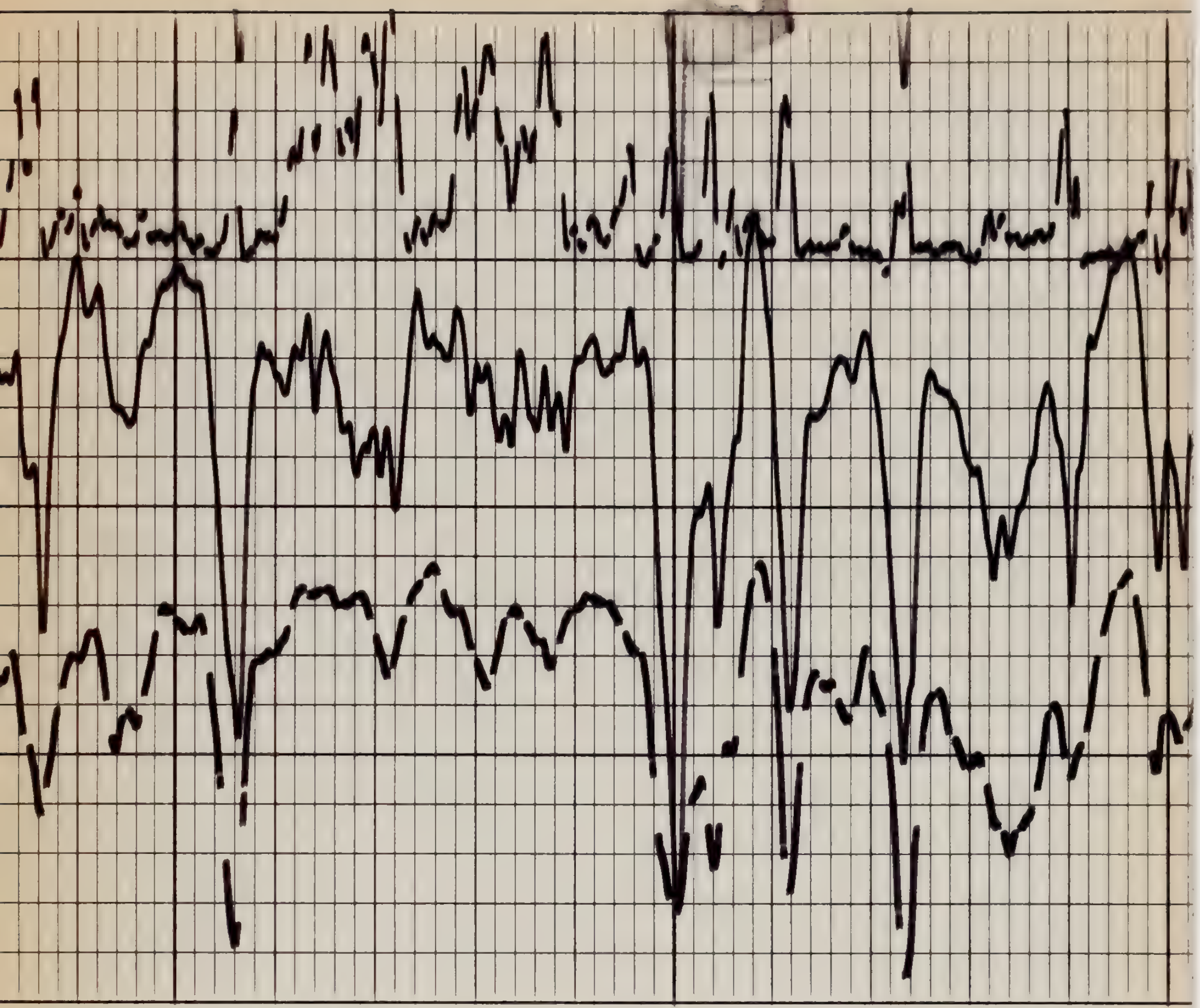

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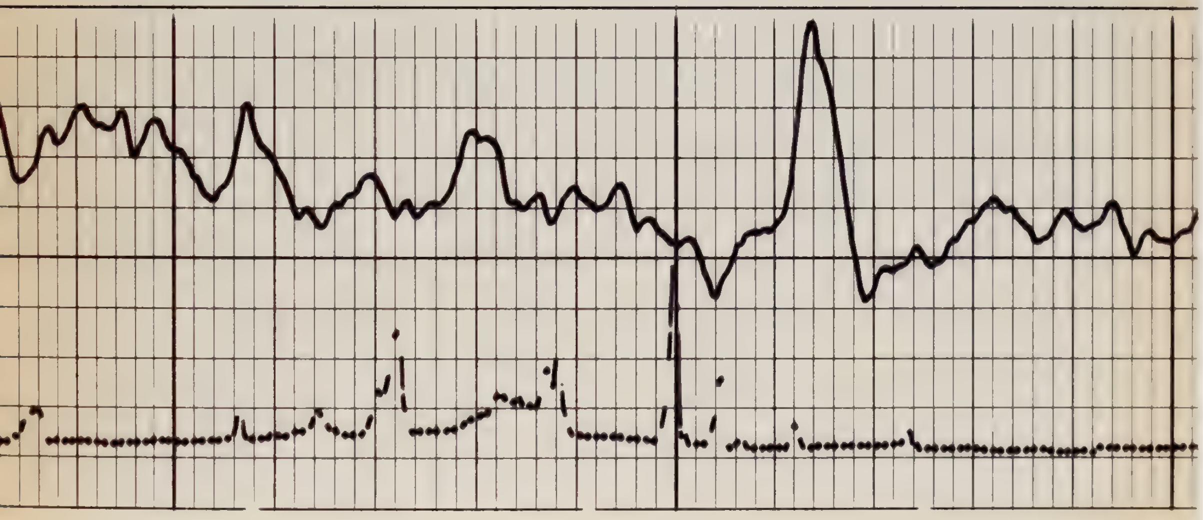

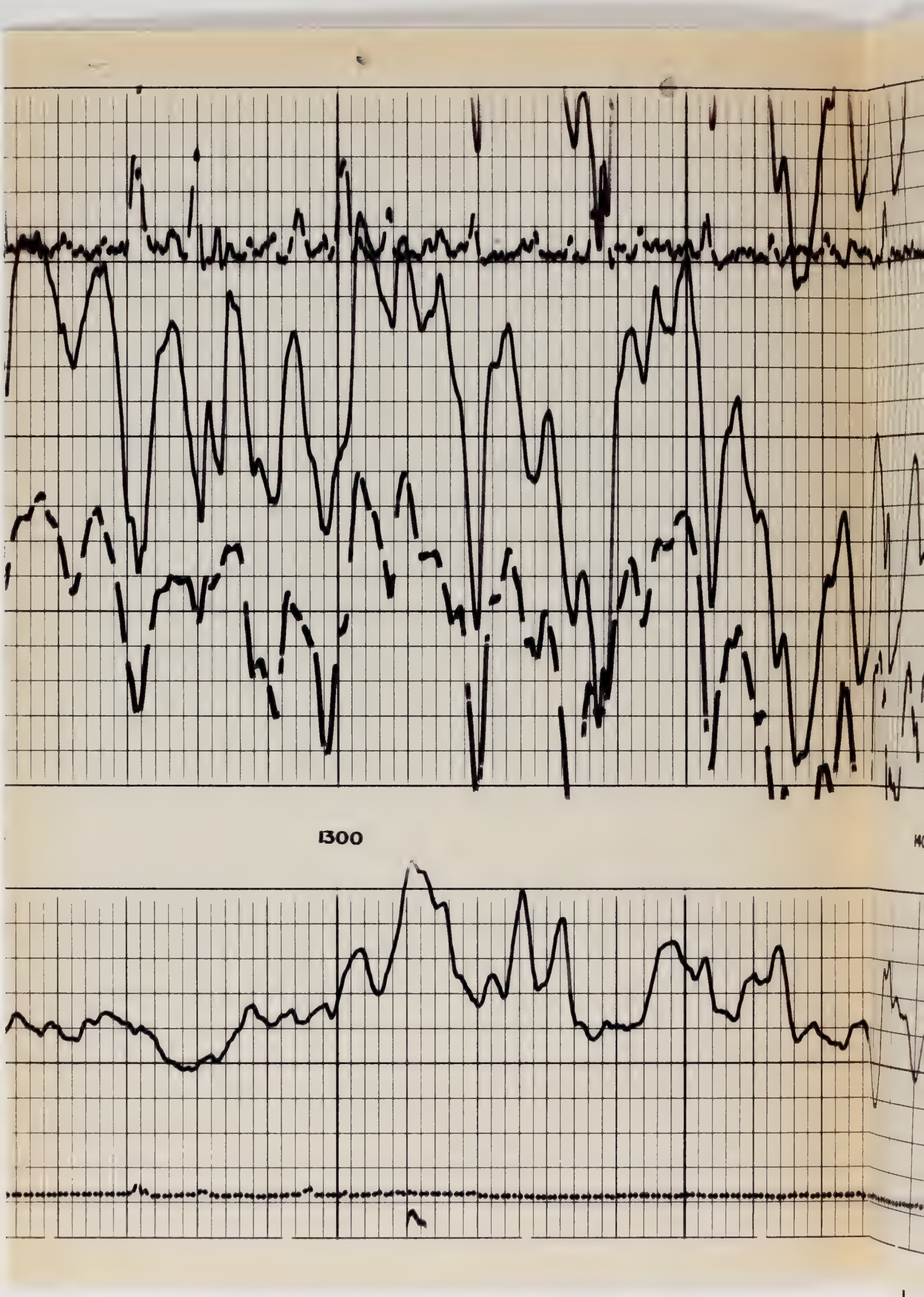
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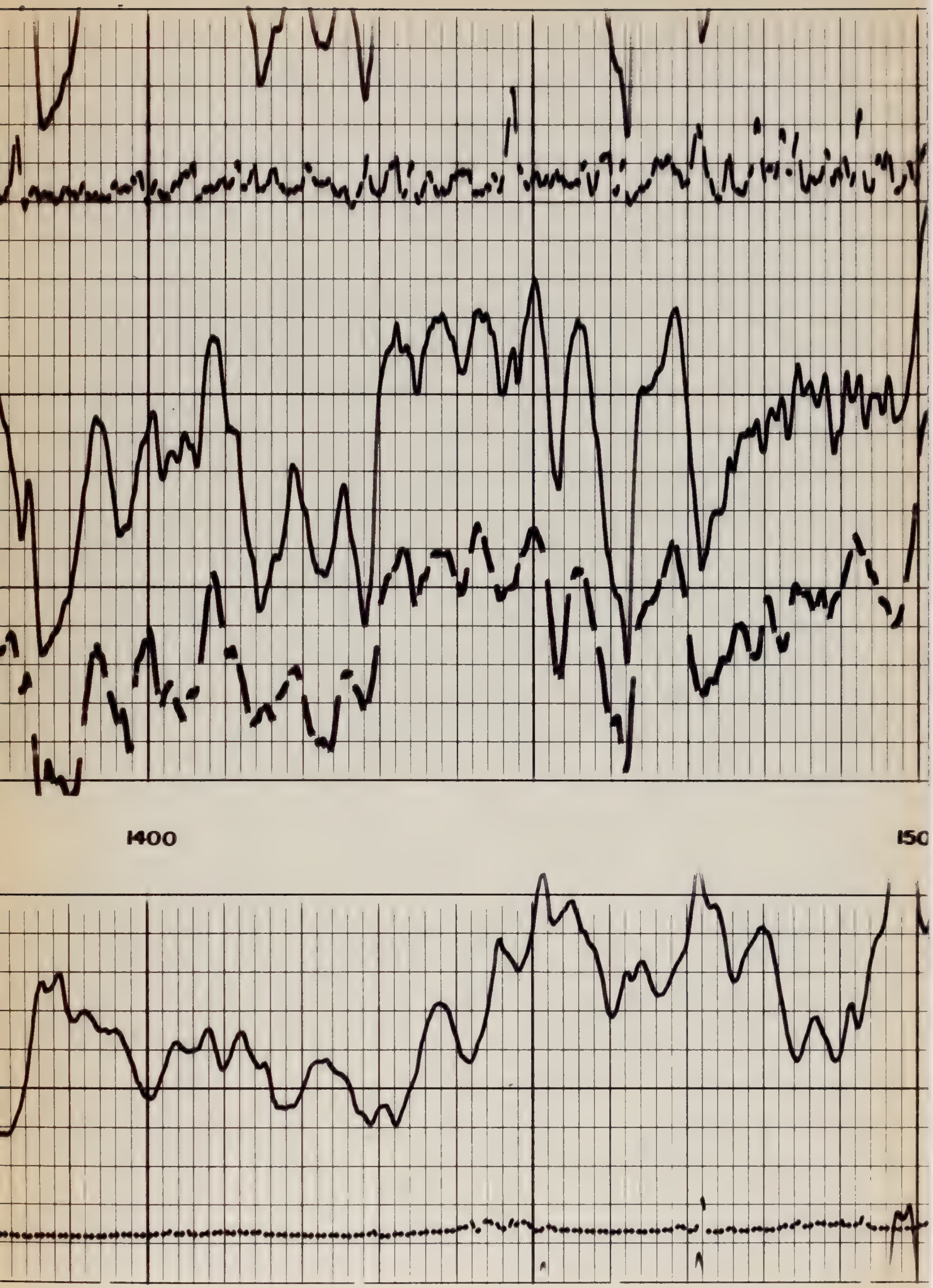
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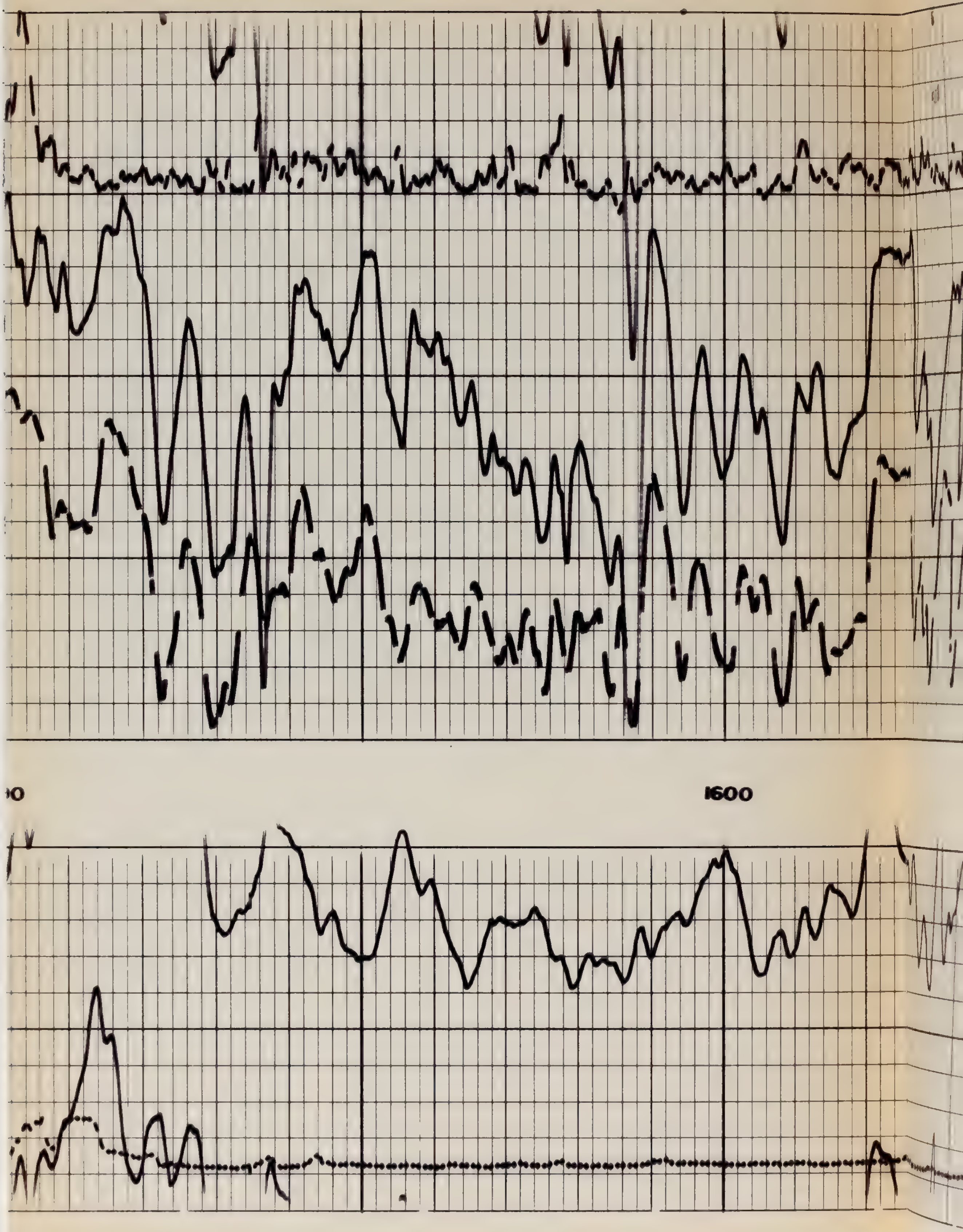
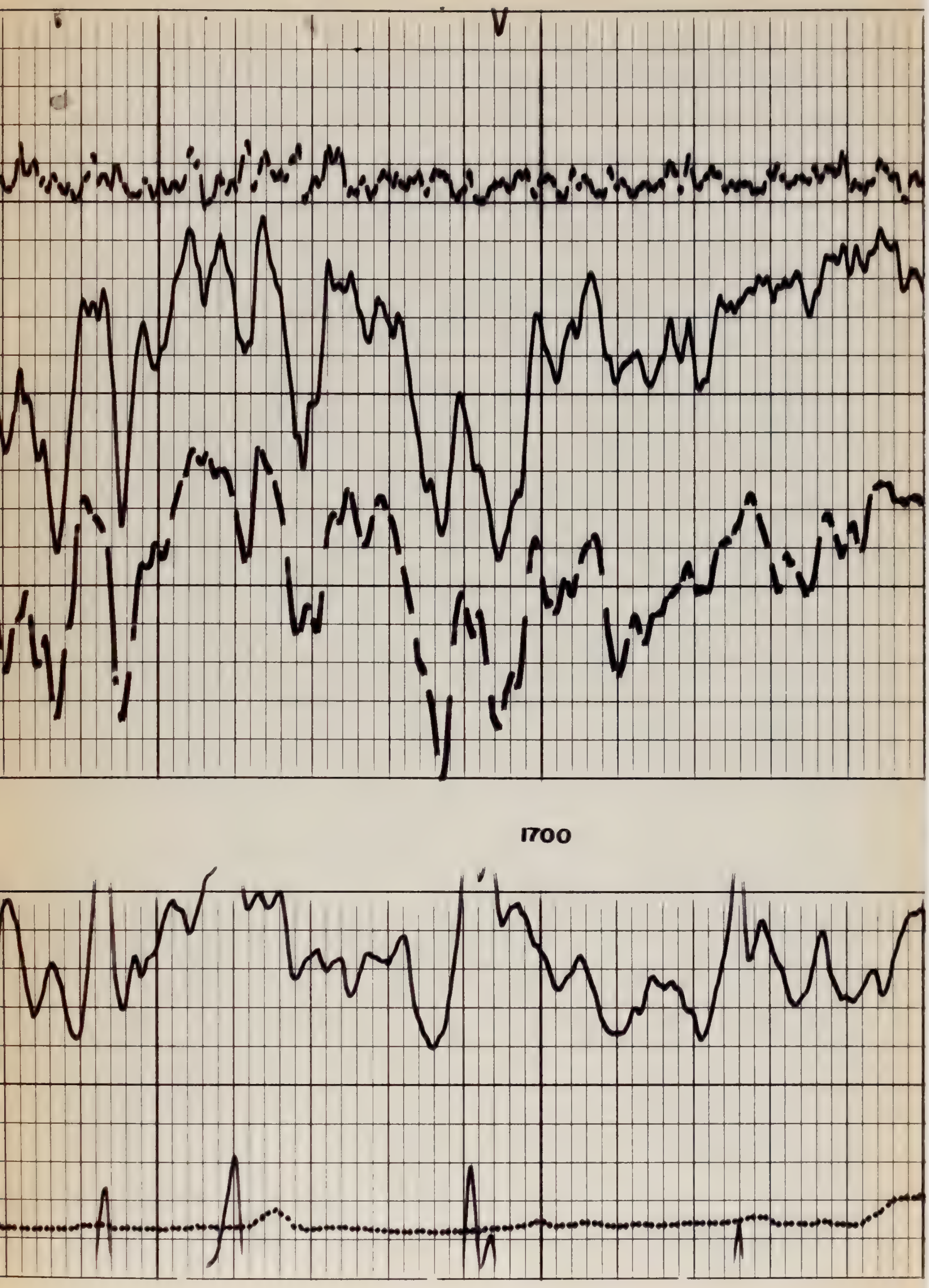

1600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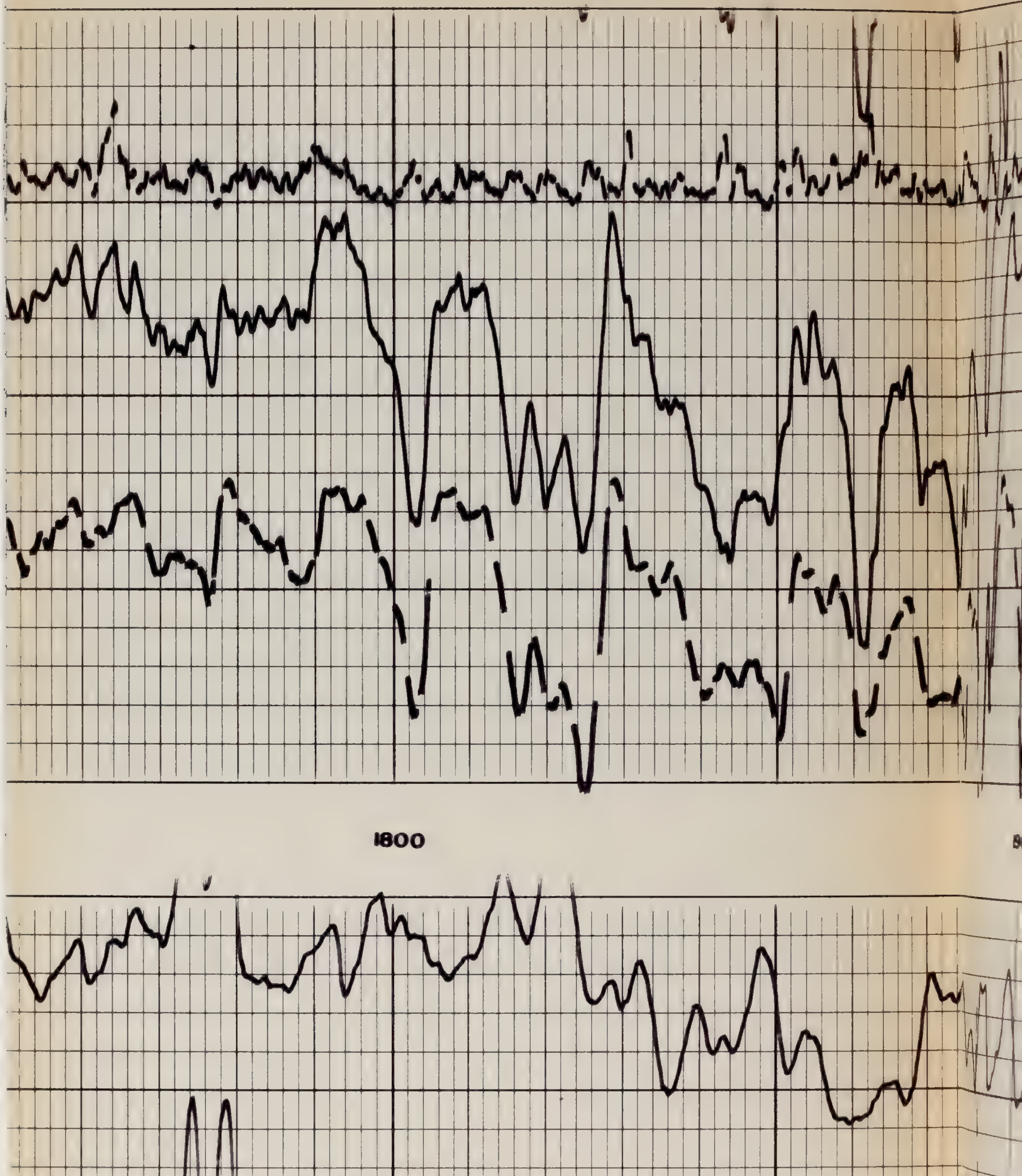
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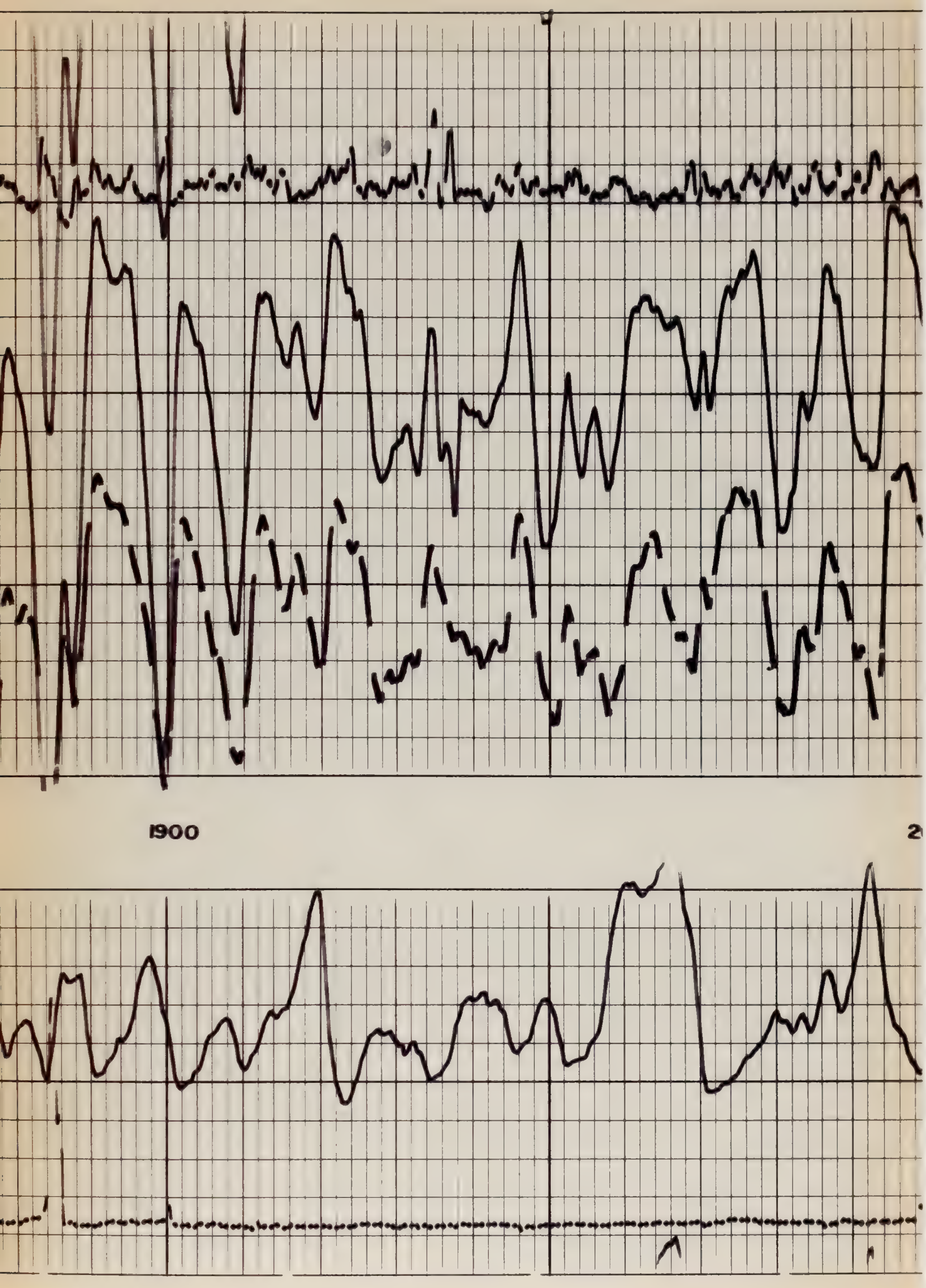
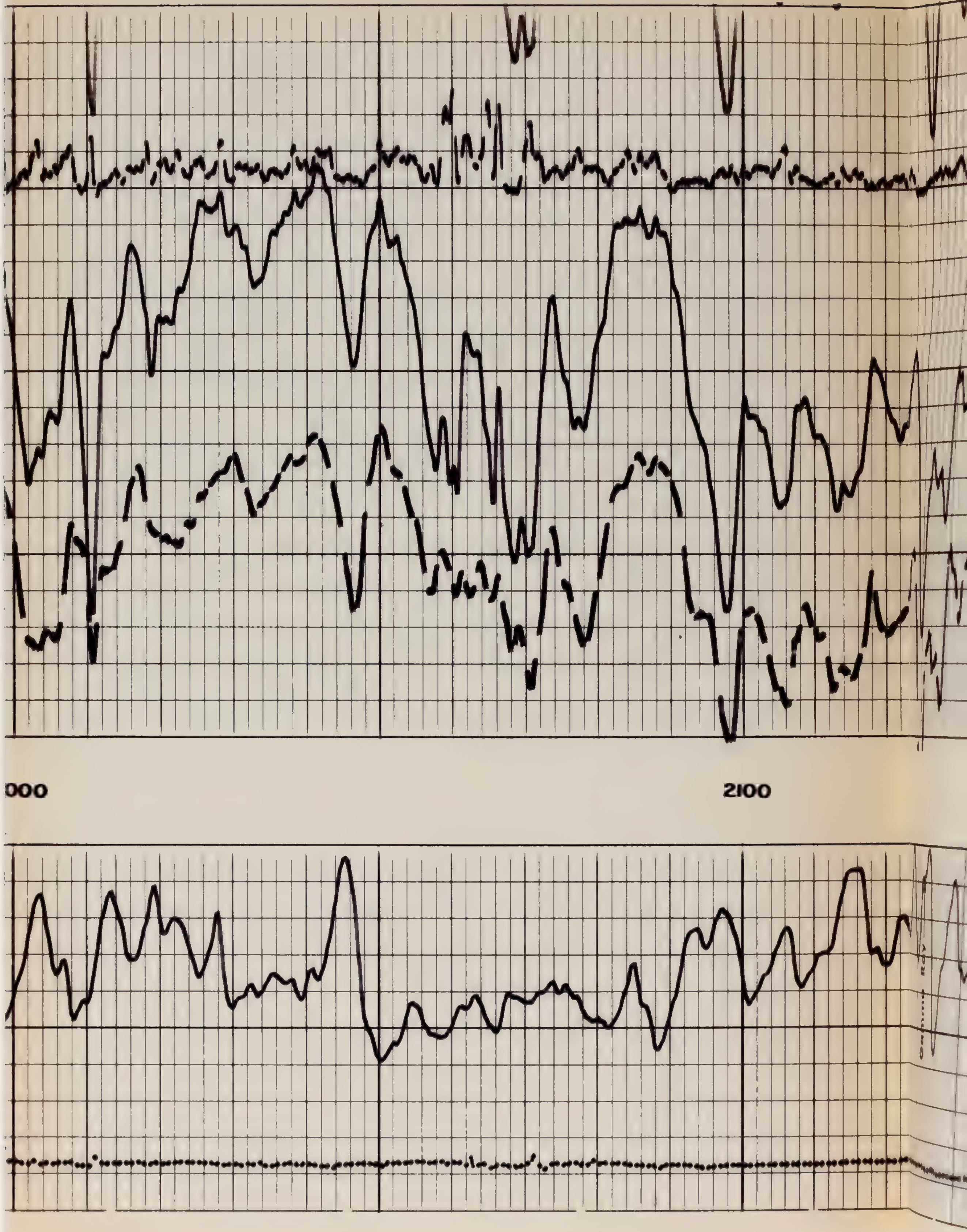
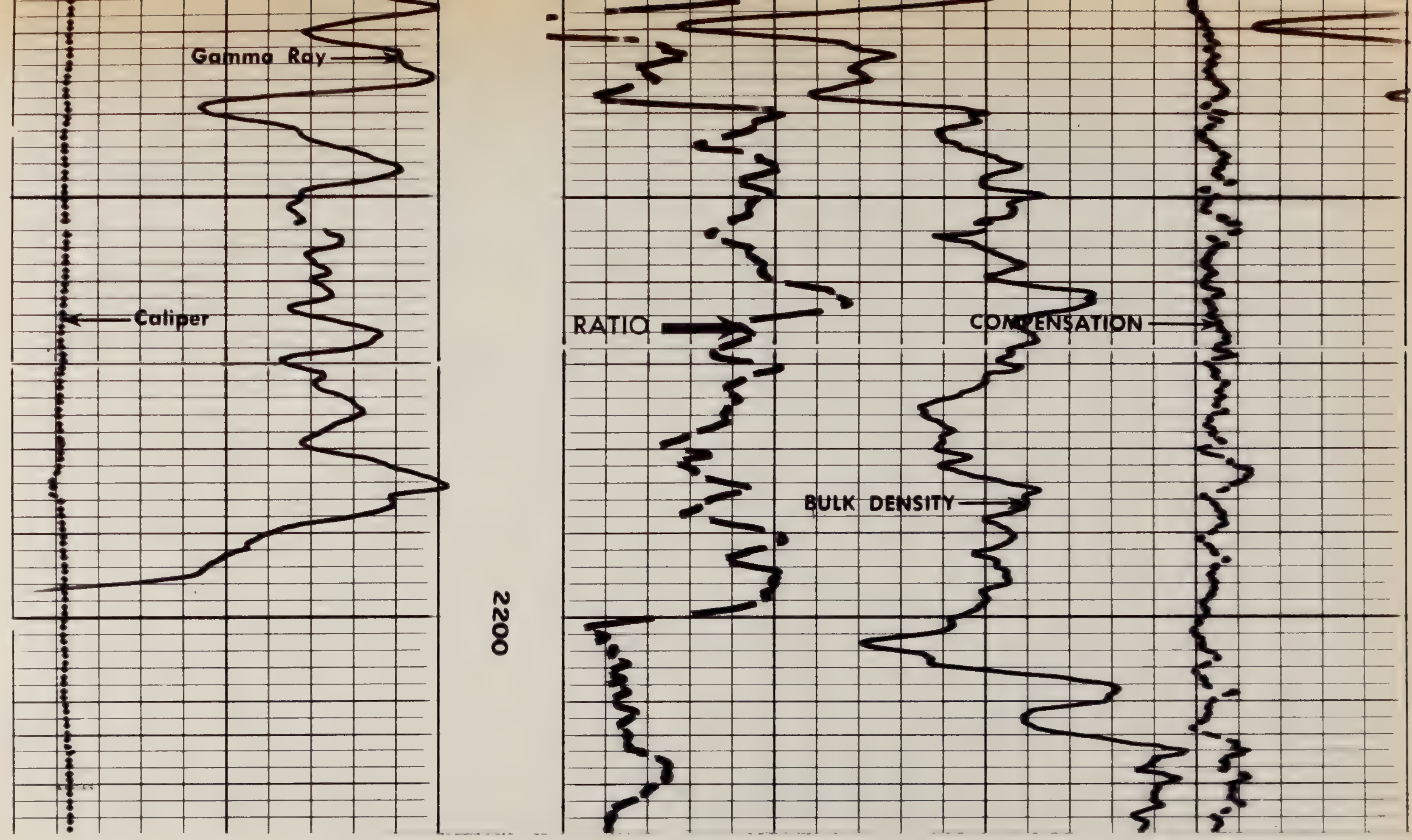
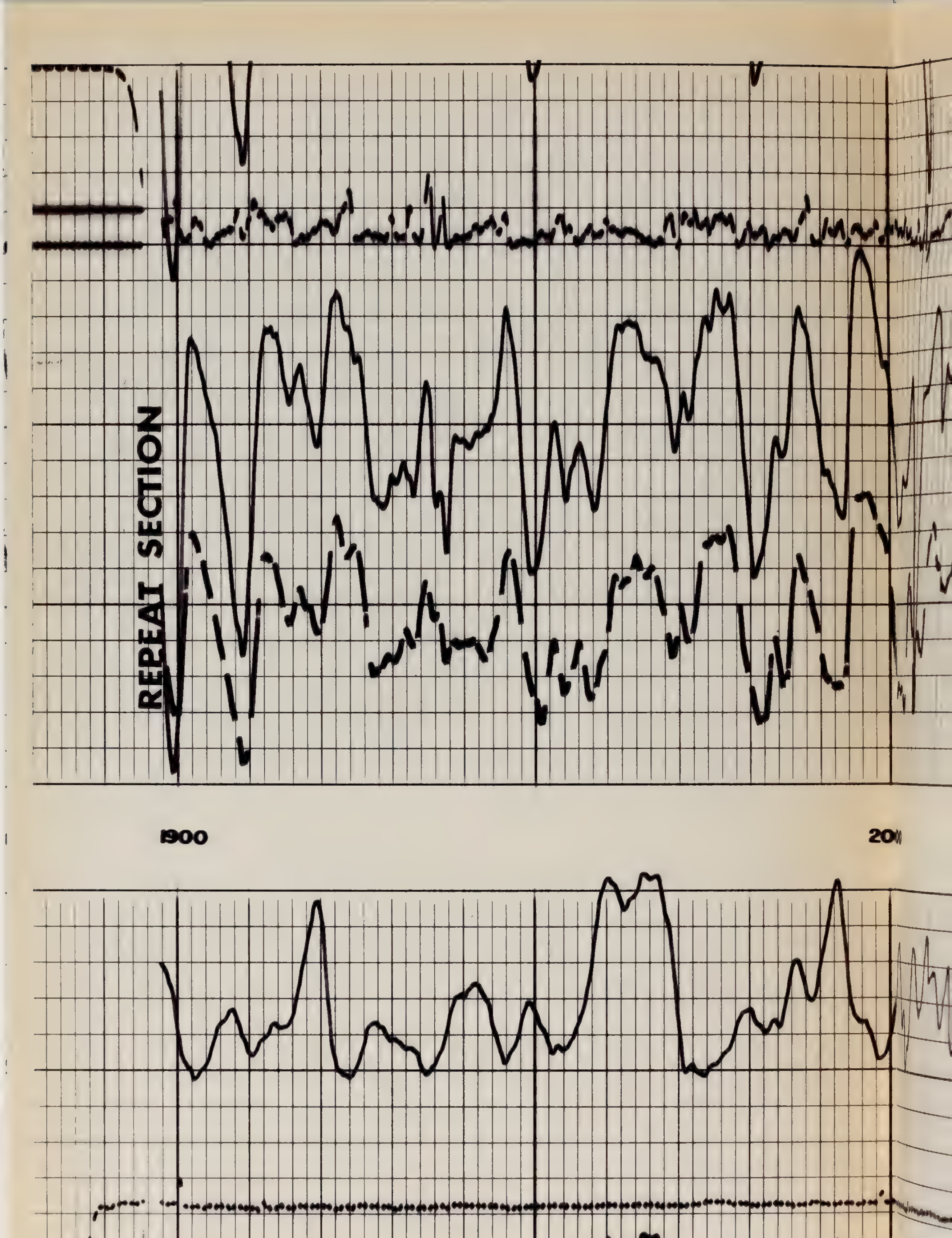
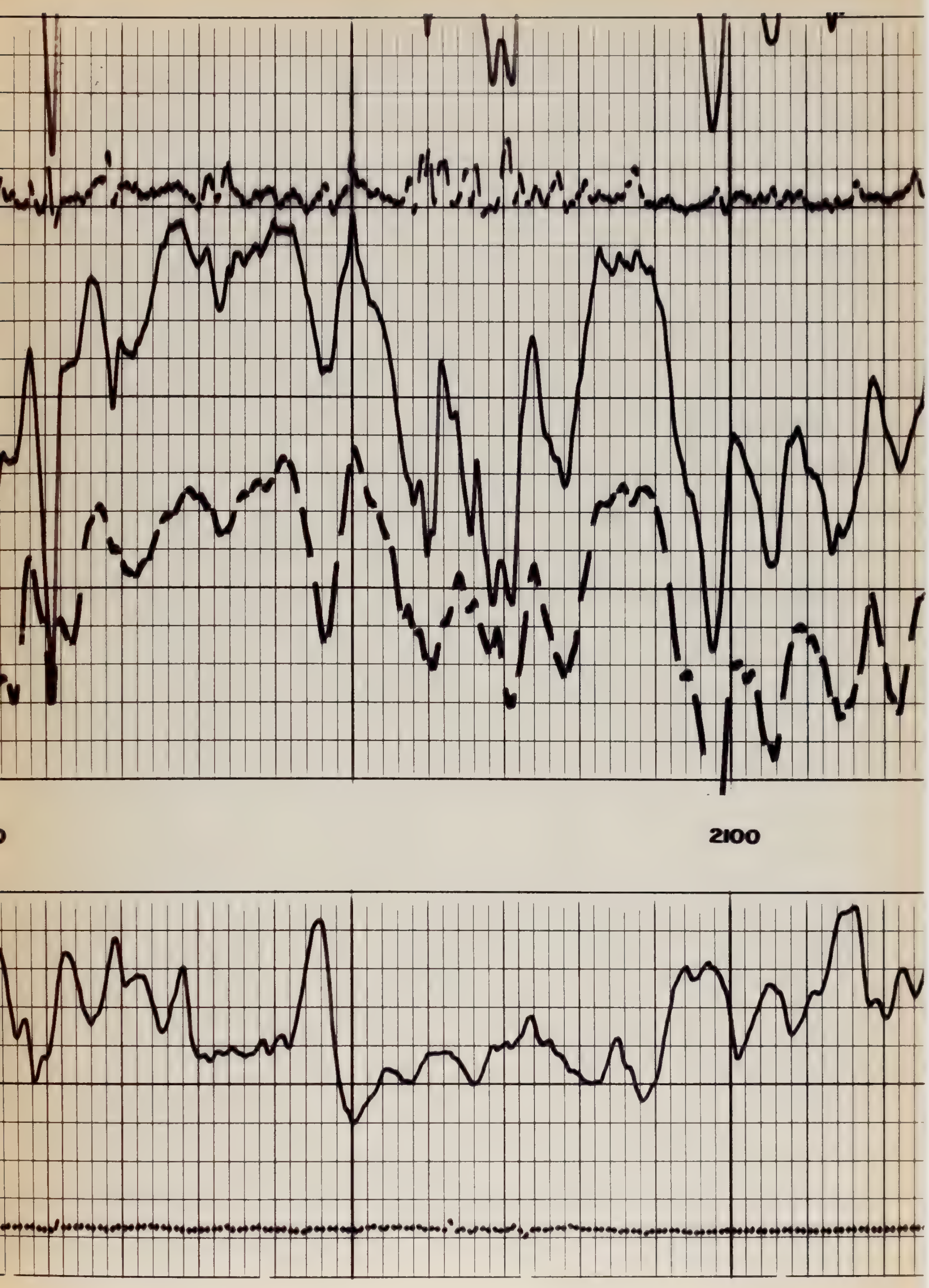

1900
2


000
2100
Gamma Ray


Gamma Ray
Caliper
2200
RATIO
BULK DENSITY
COMPENSATION


REPEAT SECTION
1900
20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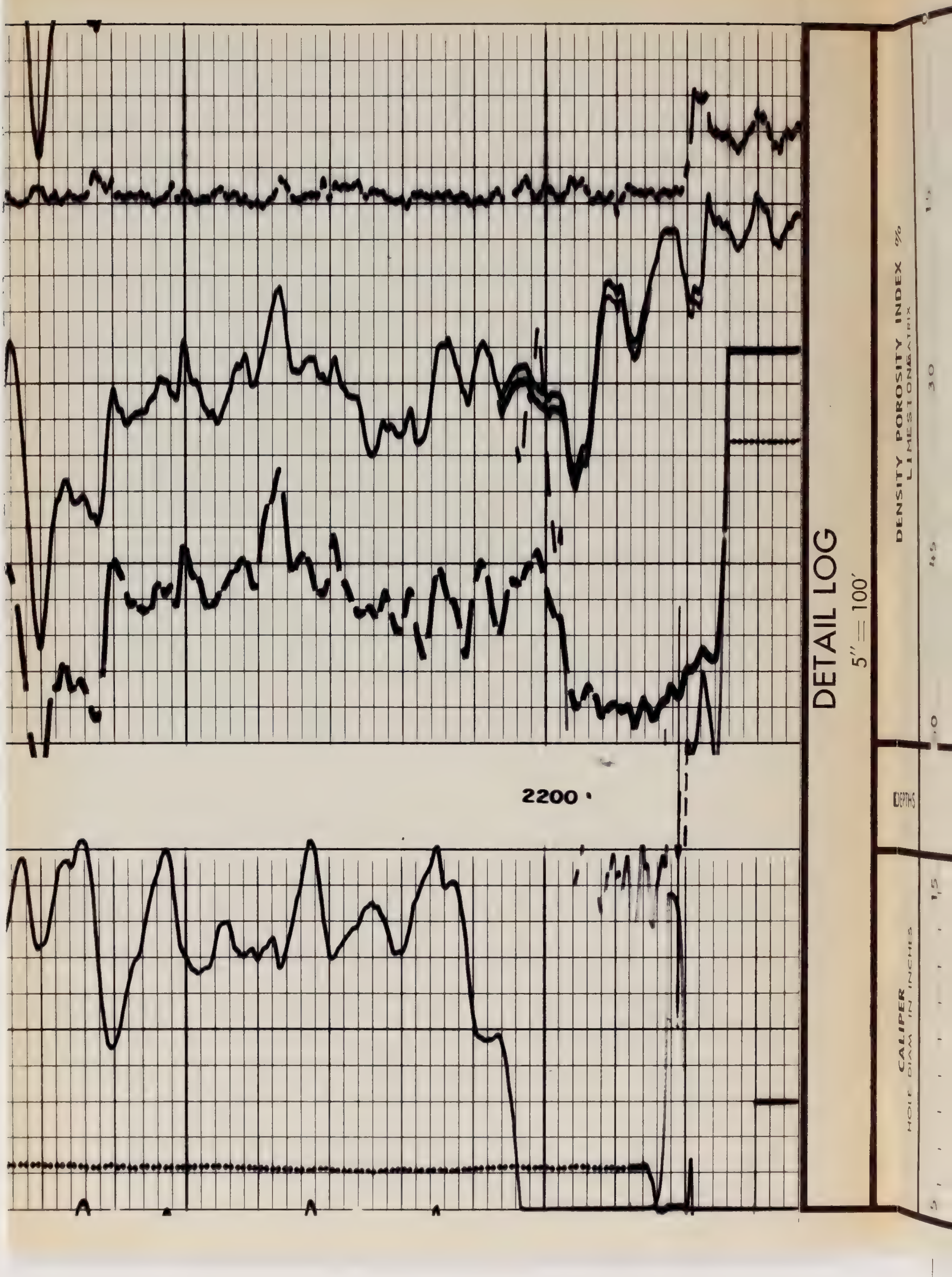
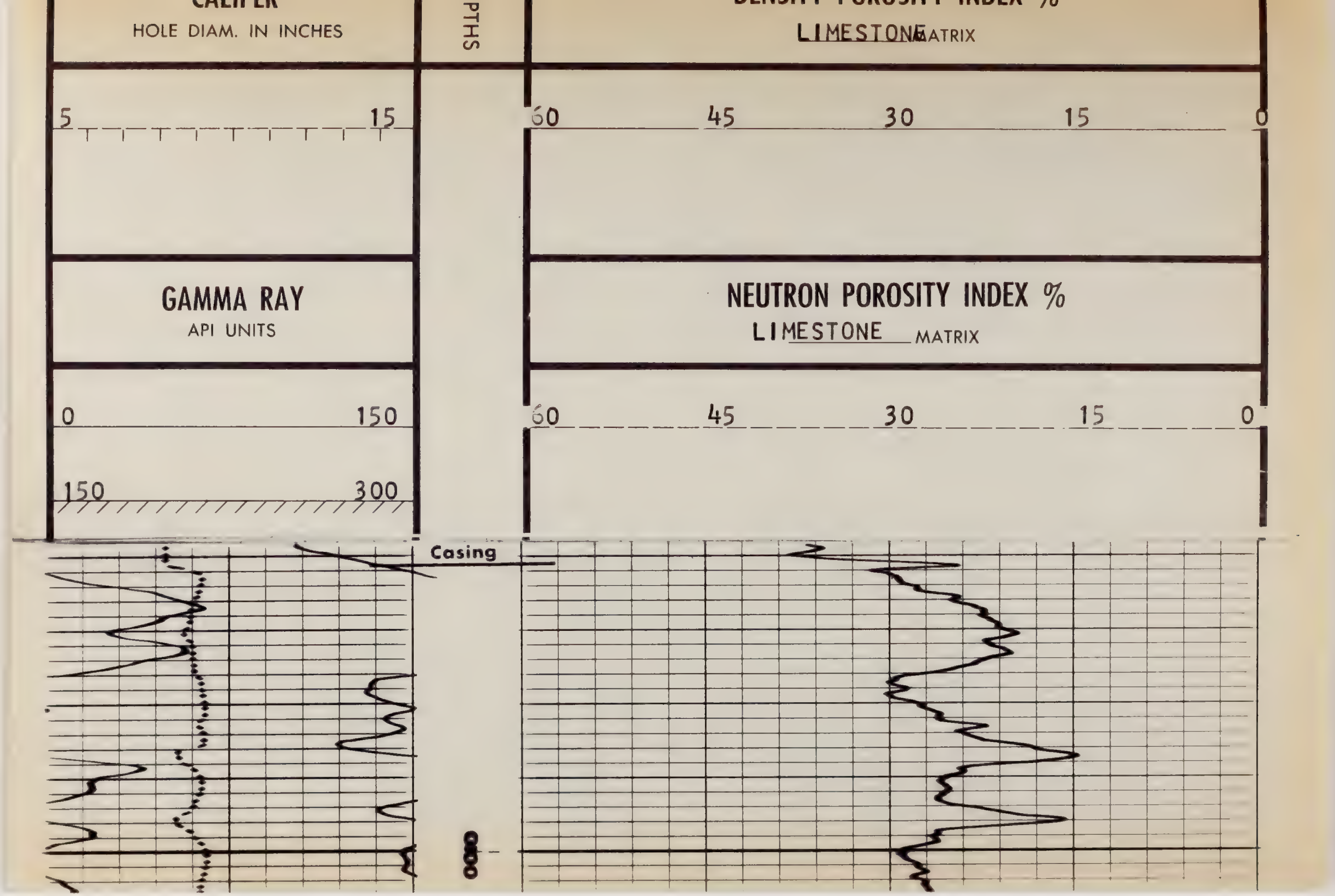
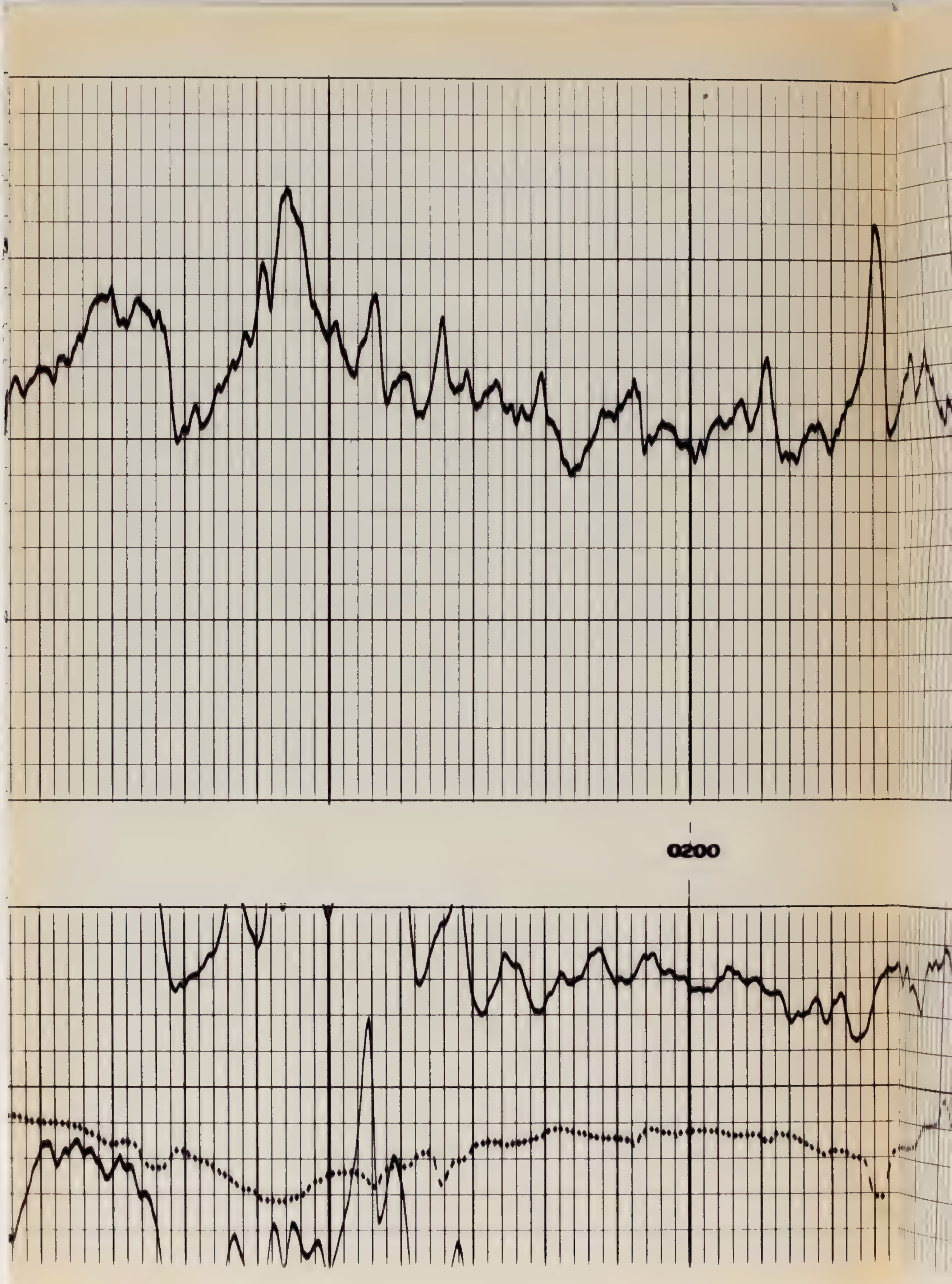
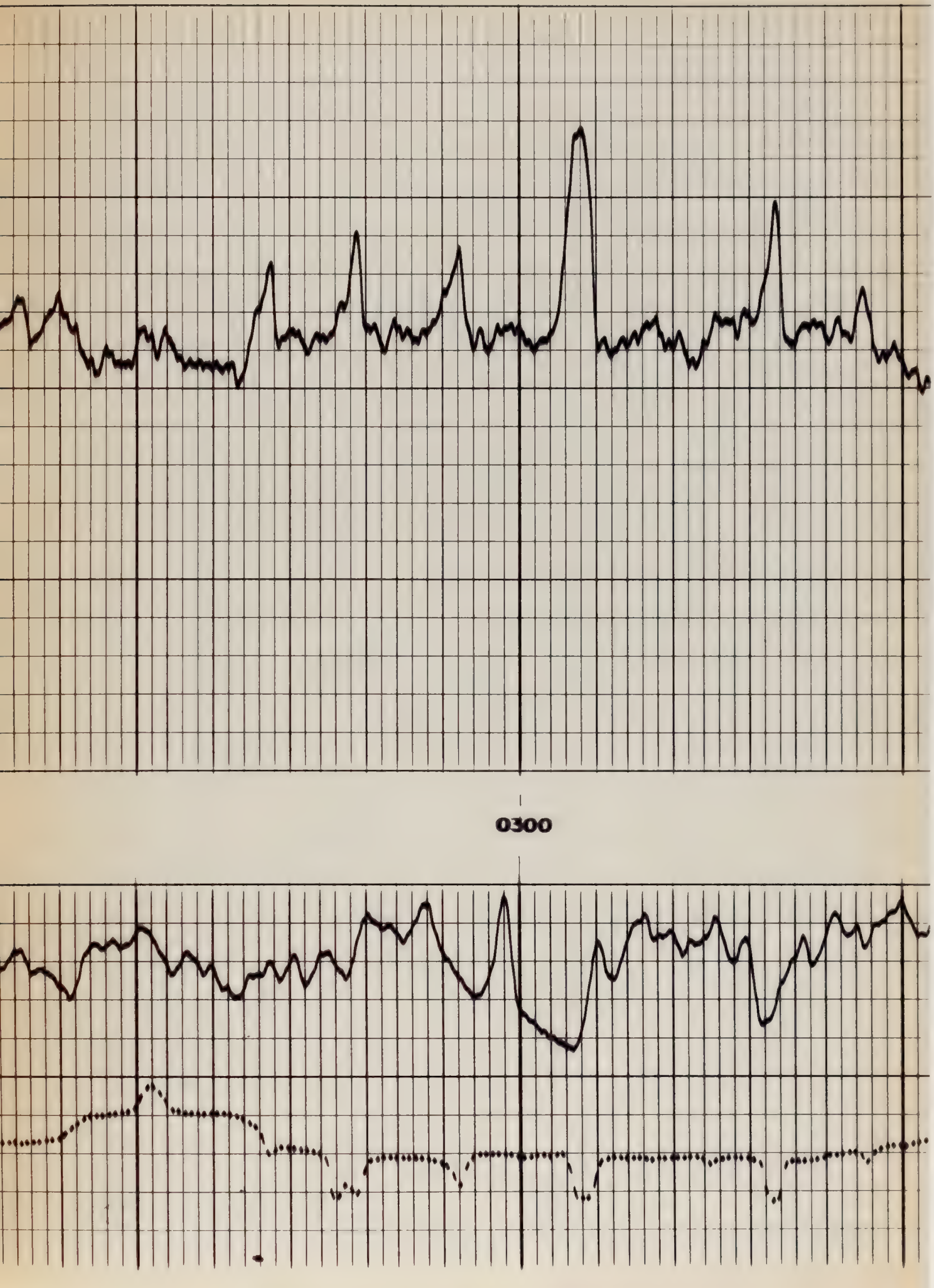

DETAIL LOG
5" = 100'
DENSITY POROSITY INDEX %
LIMESTONE MATRIX
15
30
45
0
DEPTHS
2200
CALIPER
HOLE DIAM IN INCHES
15


HOLE DIAM. IN INCHES
PTHS
LIMESTONE MATRIX
5
15
60
45
30
15
0
GAMMA RAY
API UNITS
NEUTRON POROSITY INDEX %
LIMESTONE MATRIX
0
150
60
45
30
15
0
150
300
Casing
0100


0200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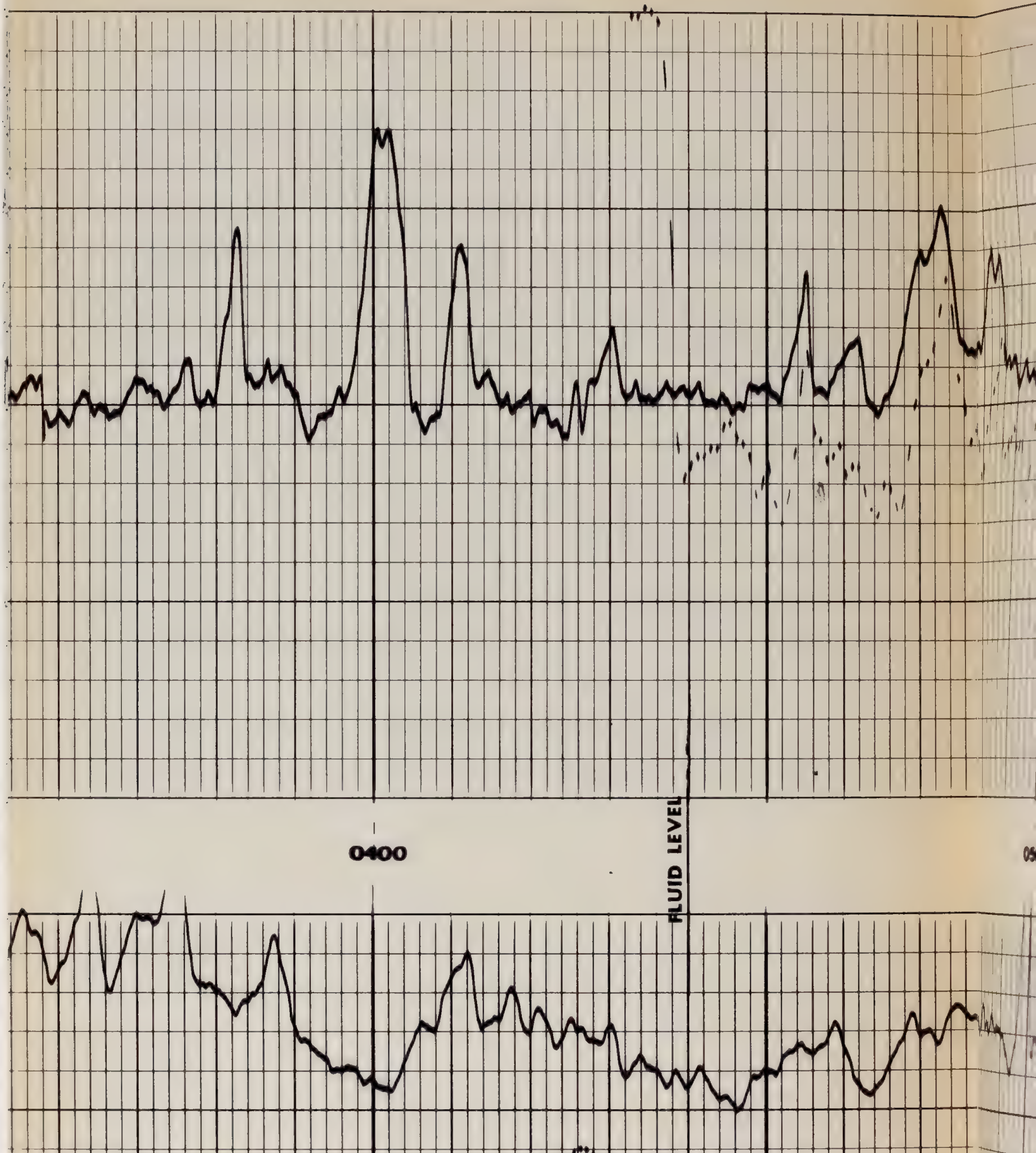
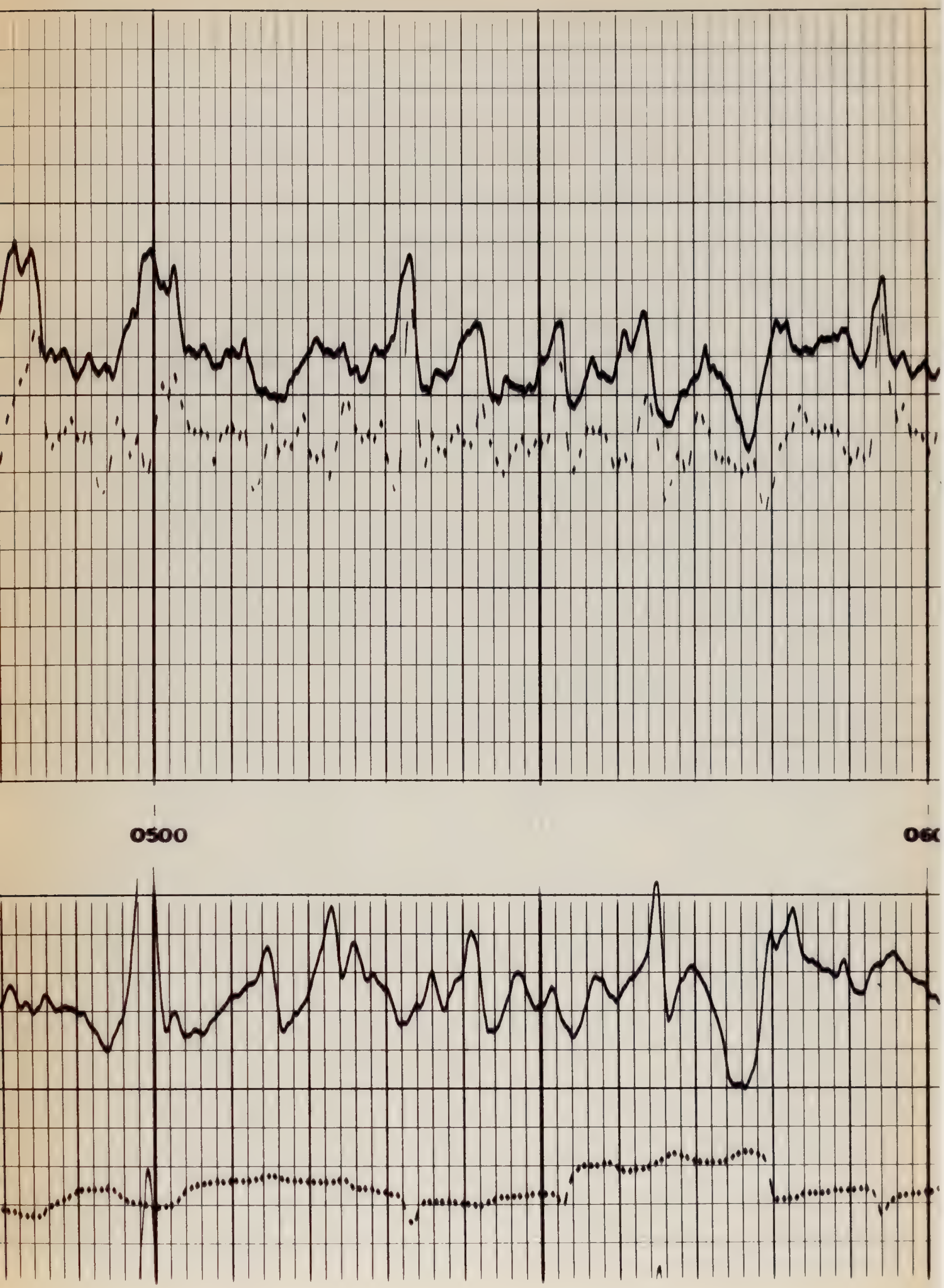

0400
FLUID LEVEL
05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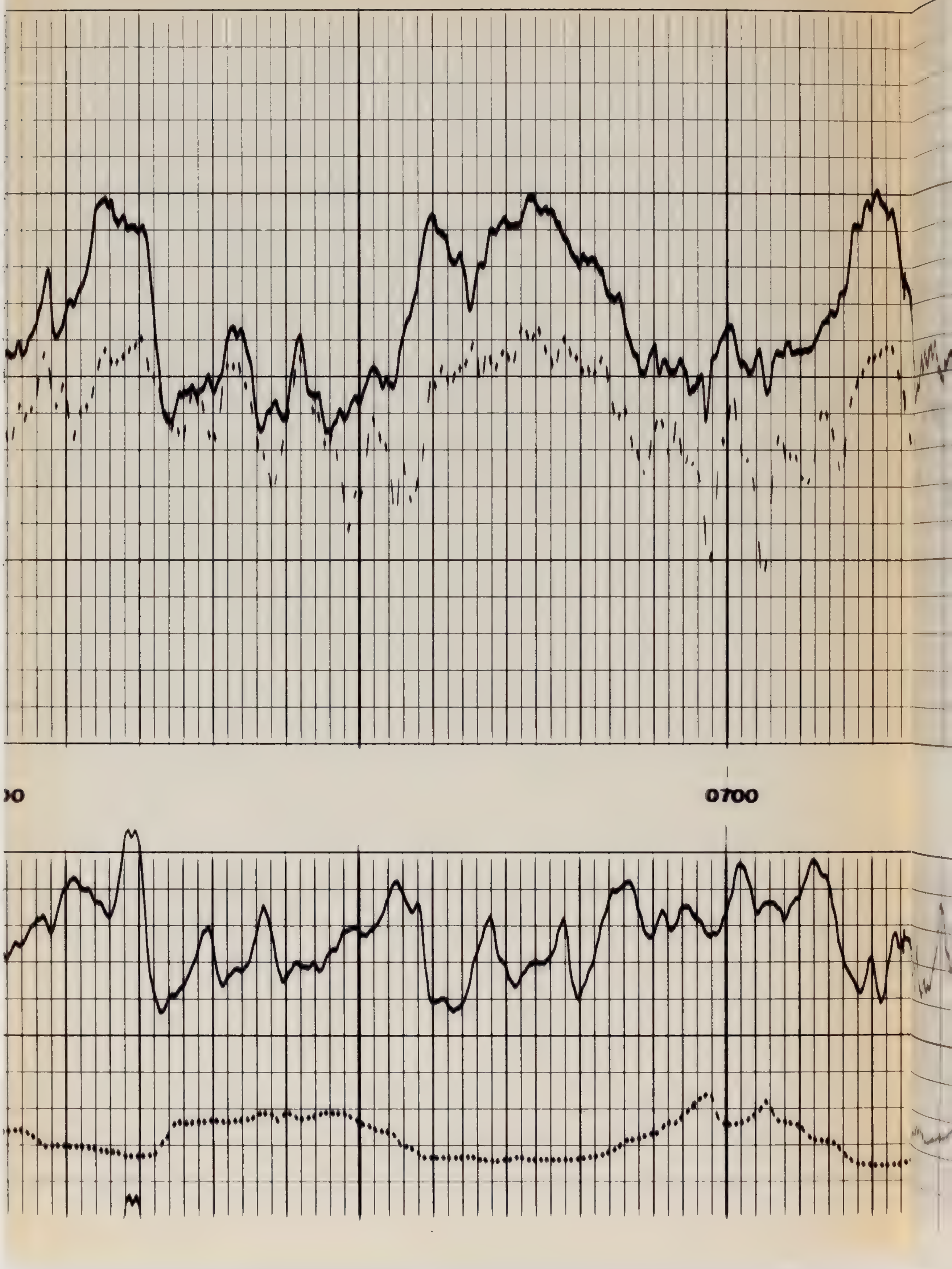
06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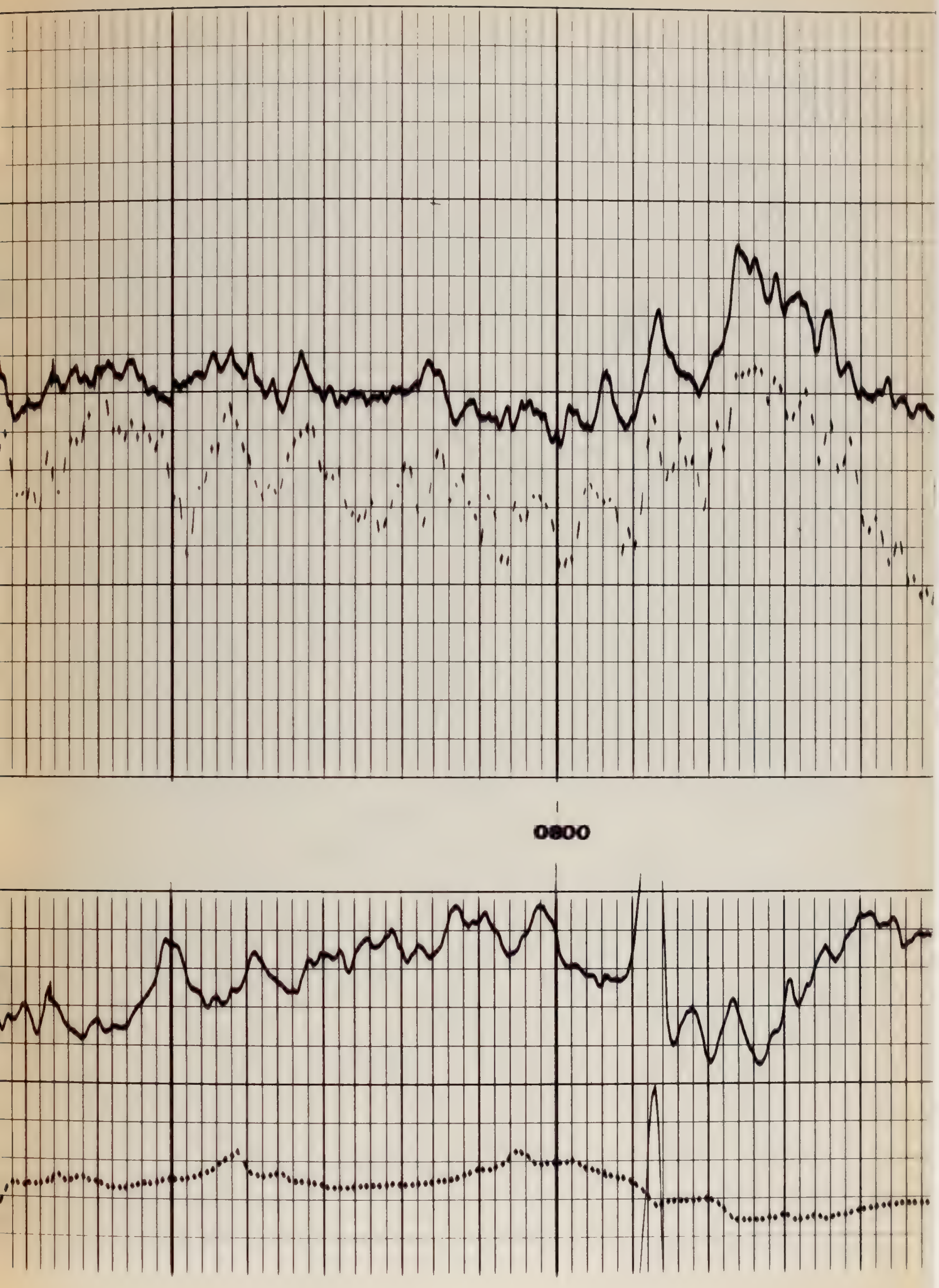
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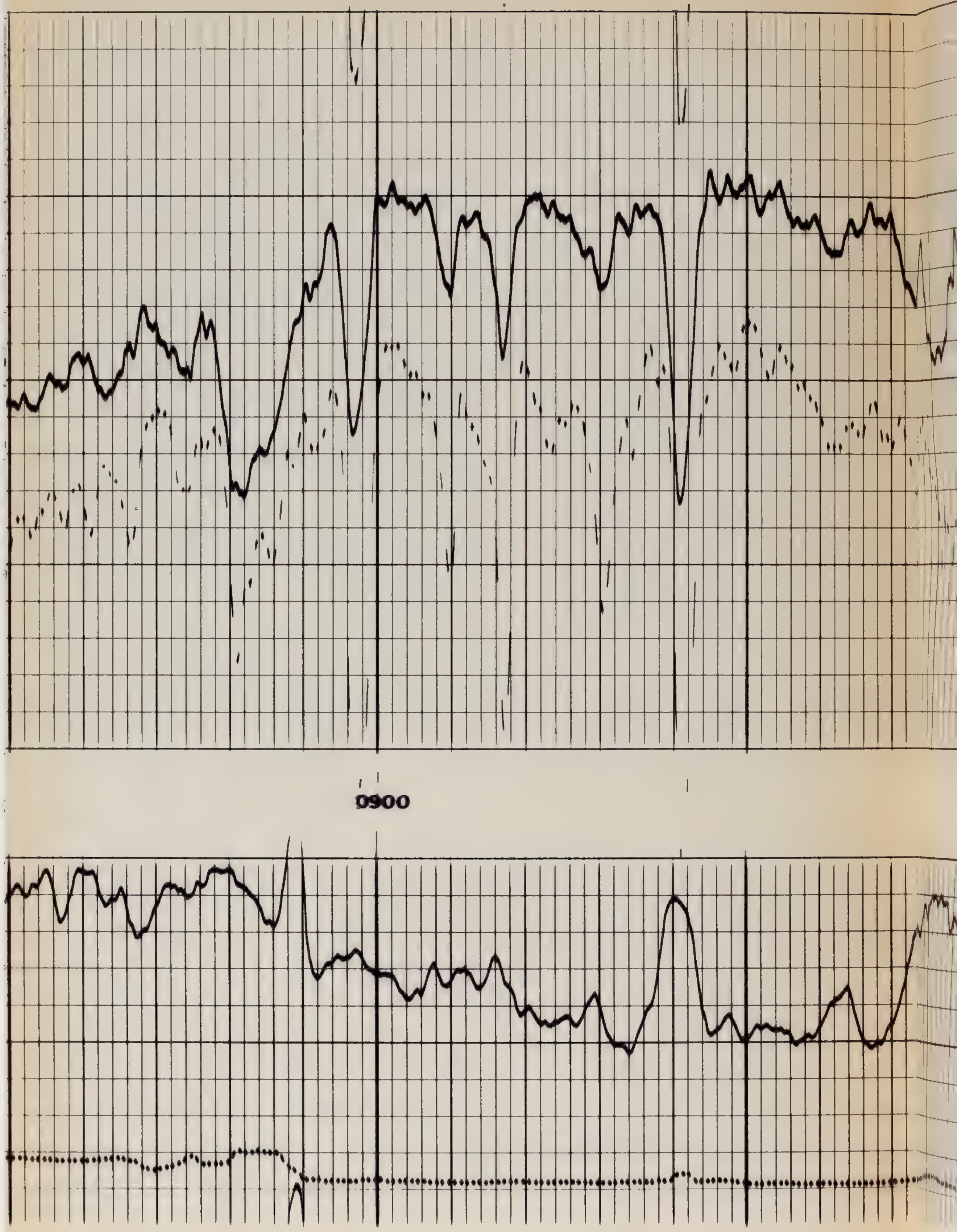
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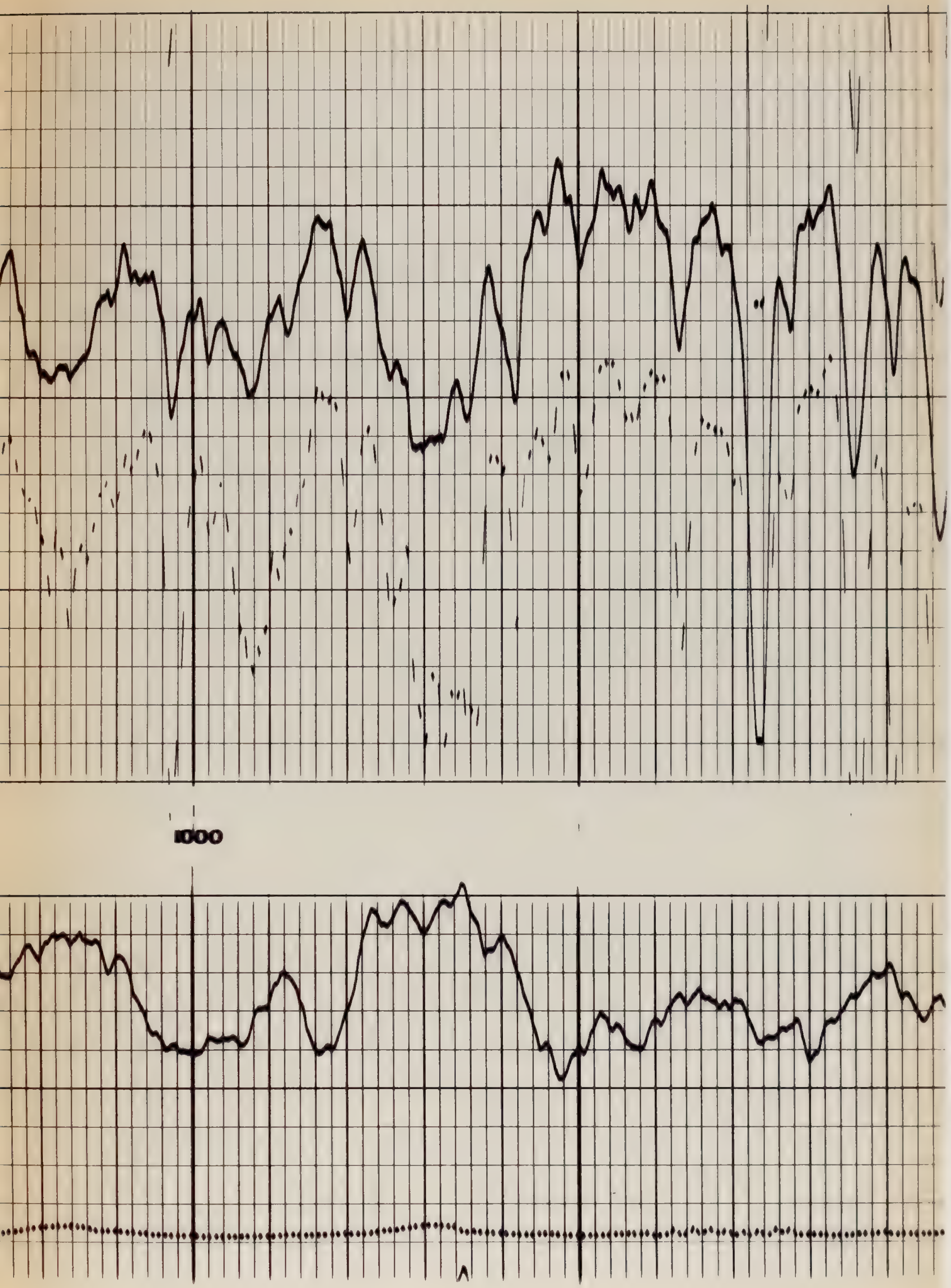
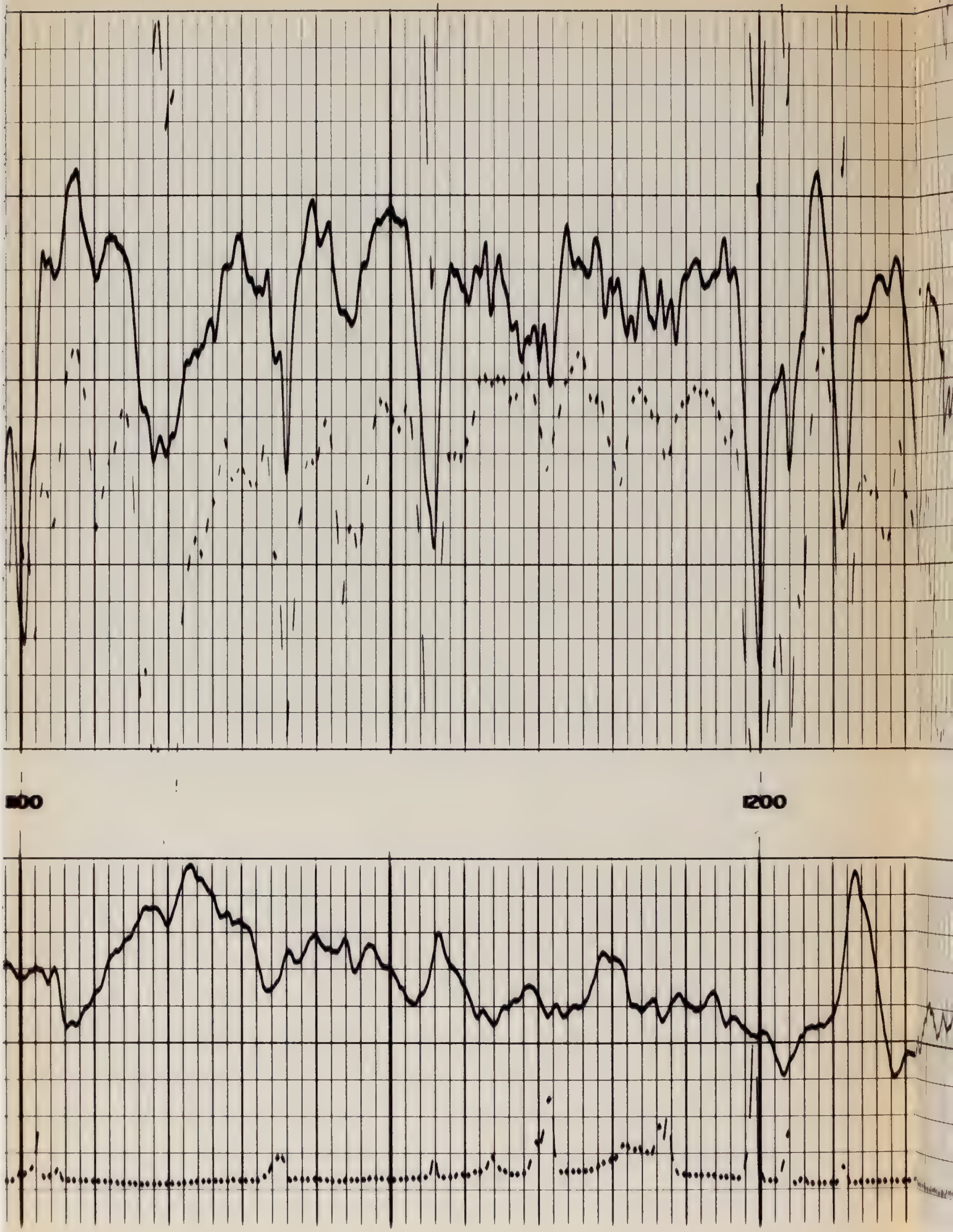
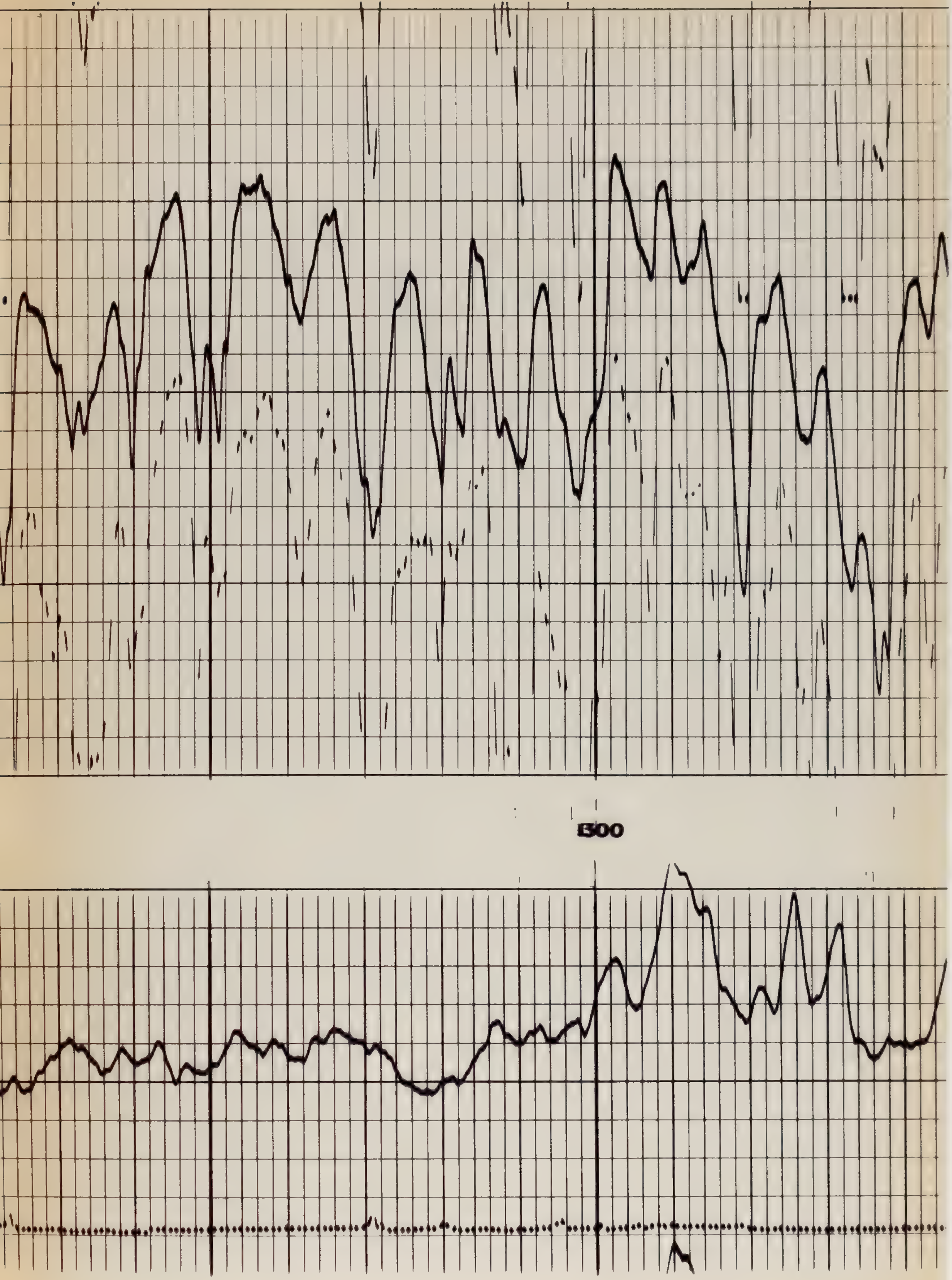

1000


1100
1200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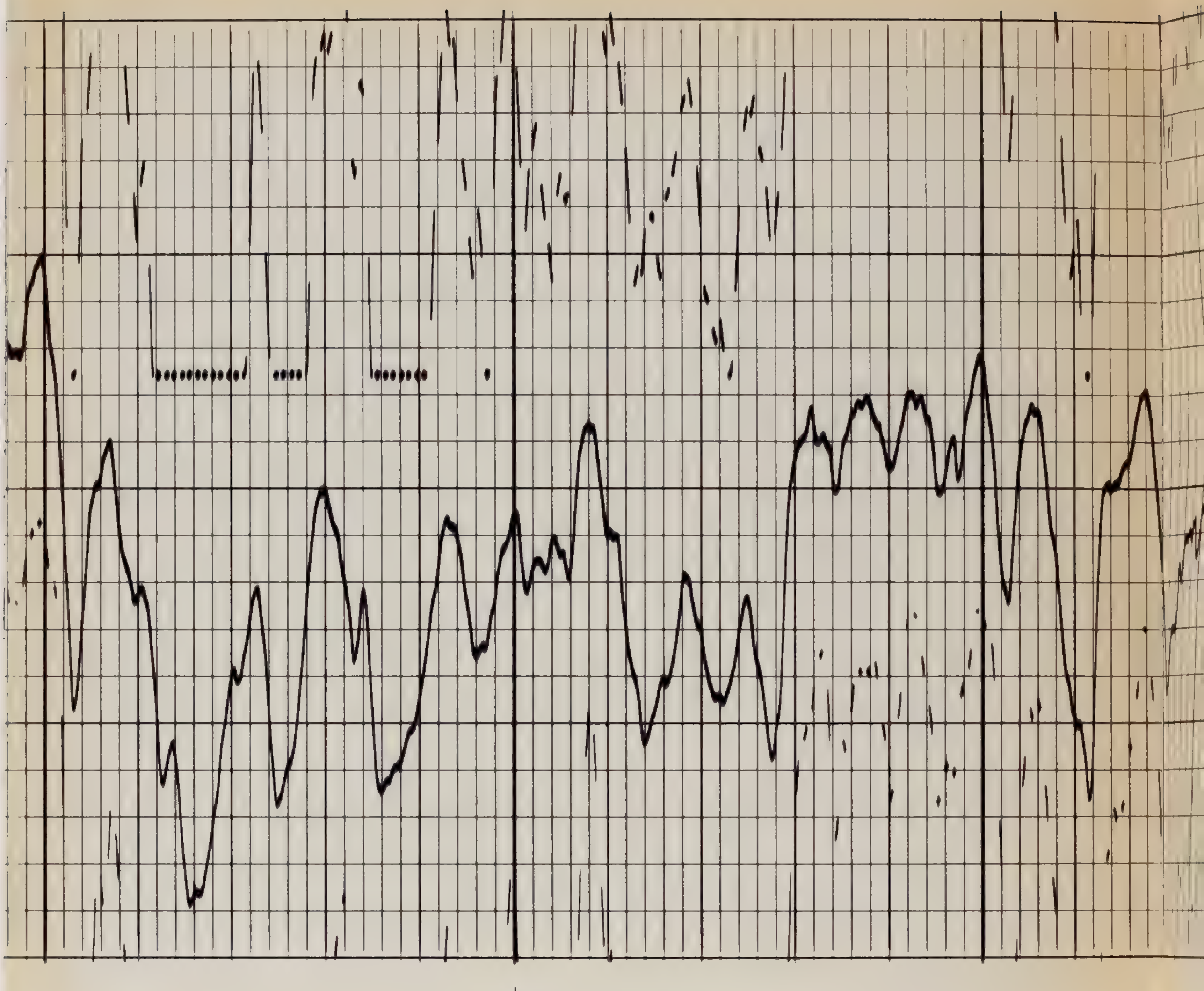
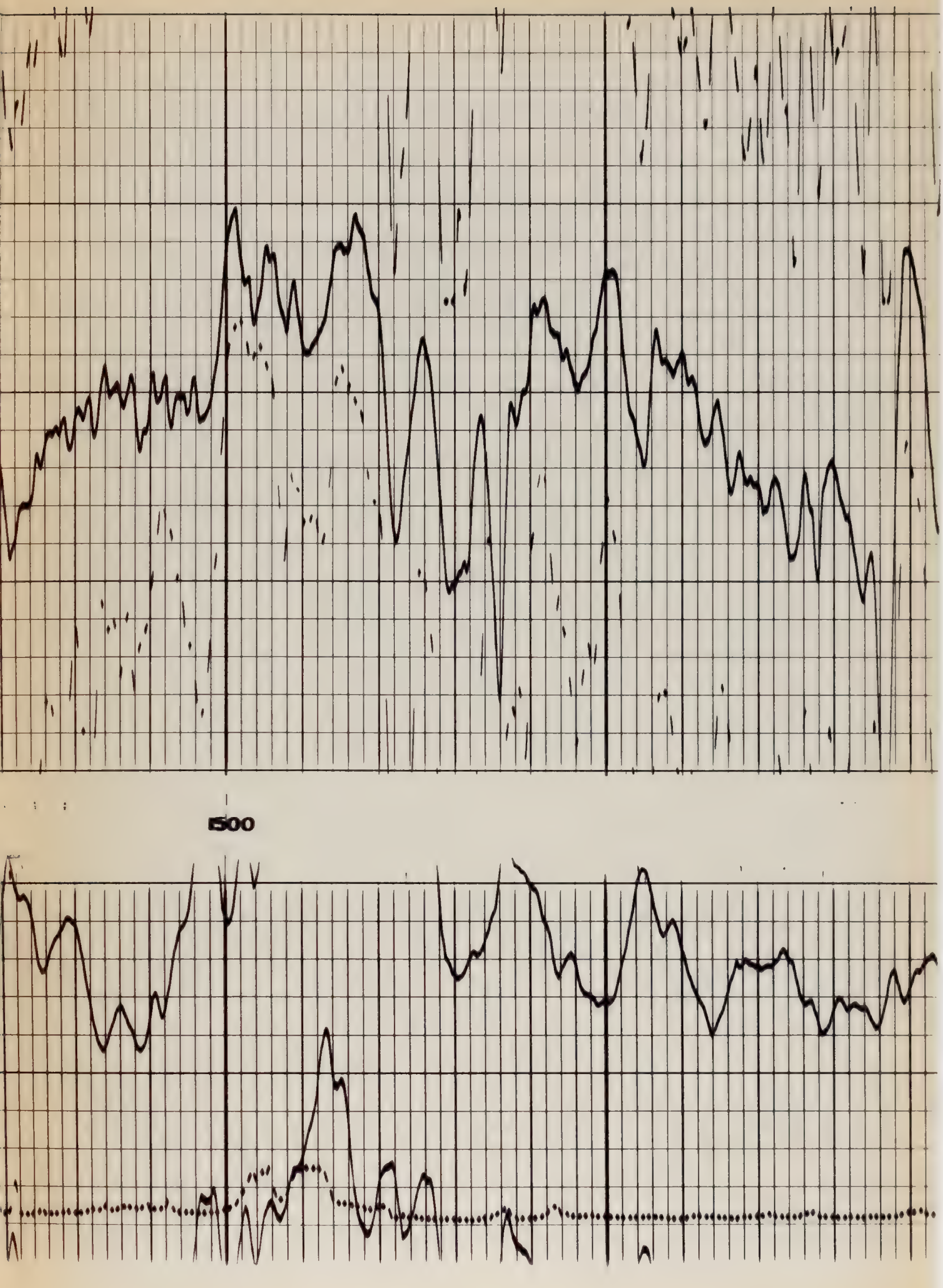
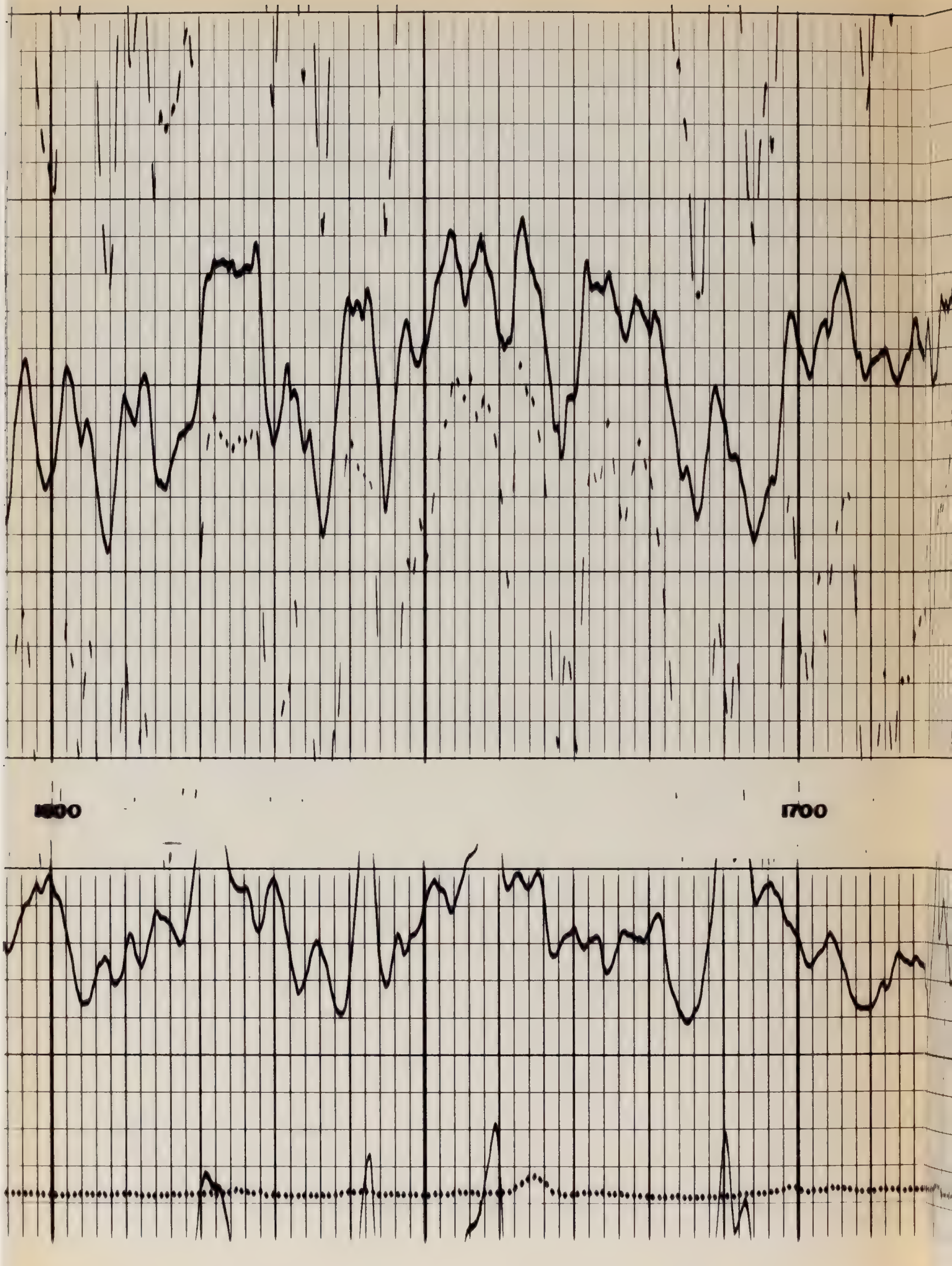
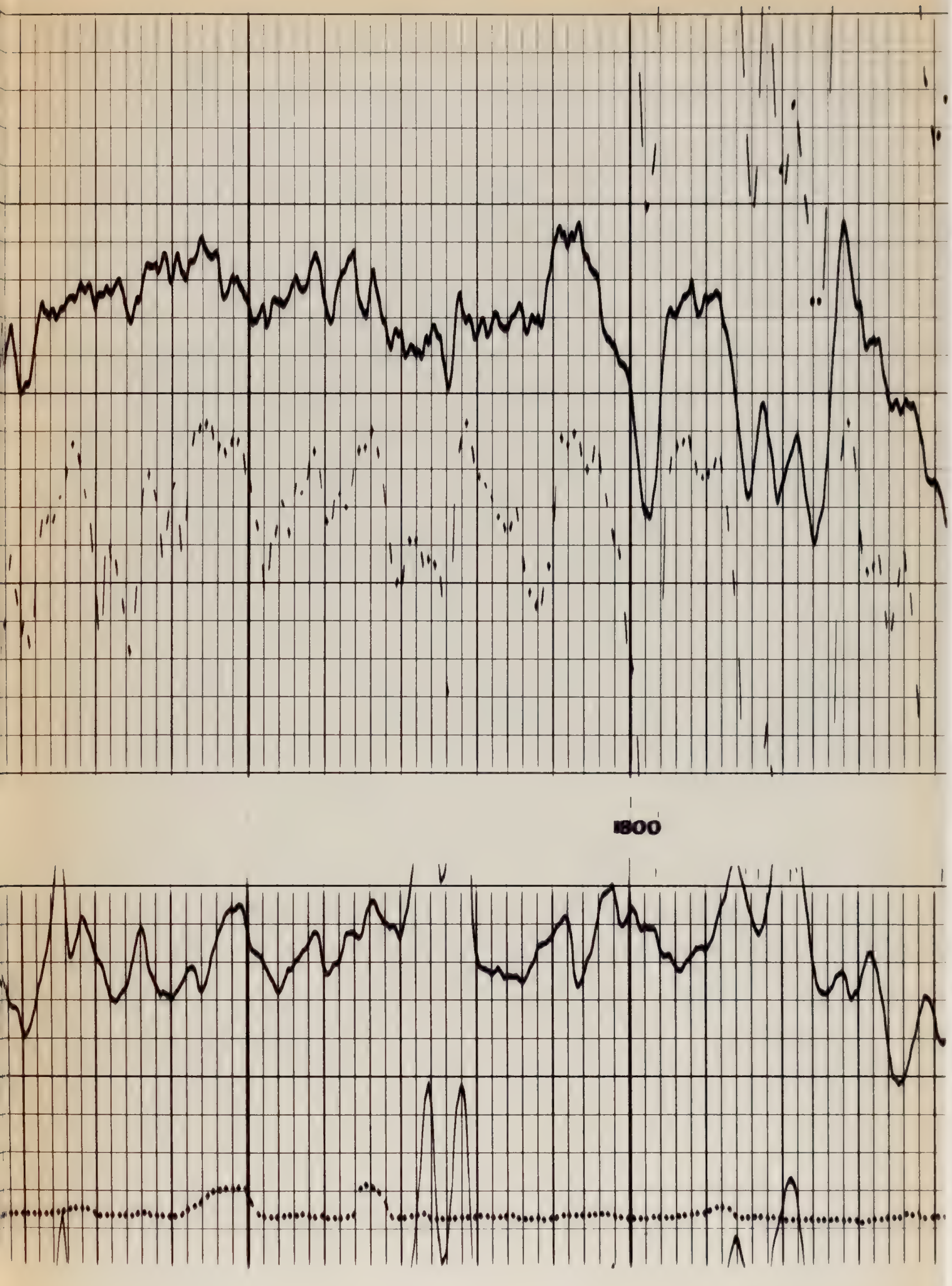
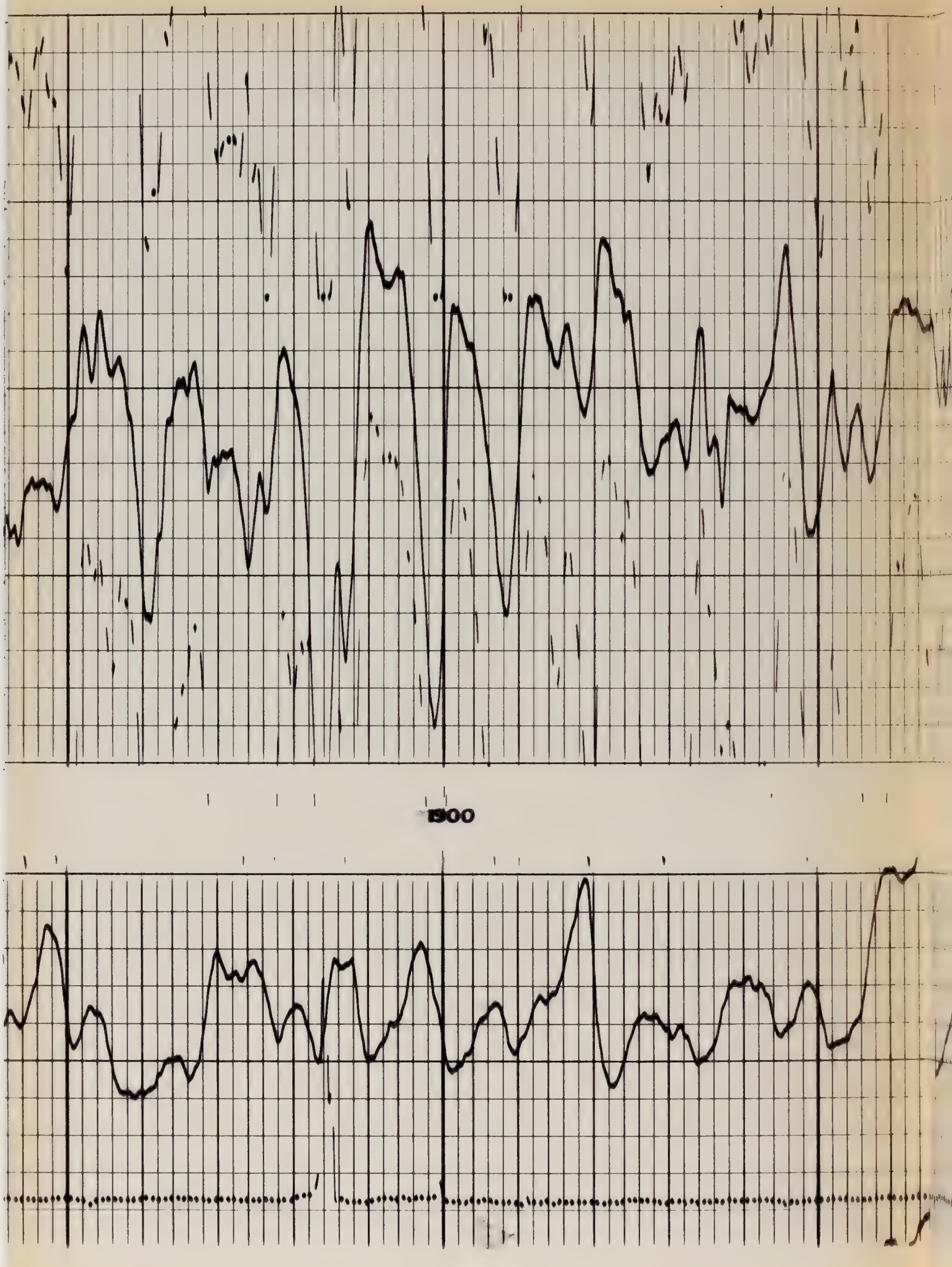
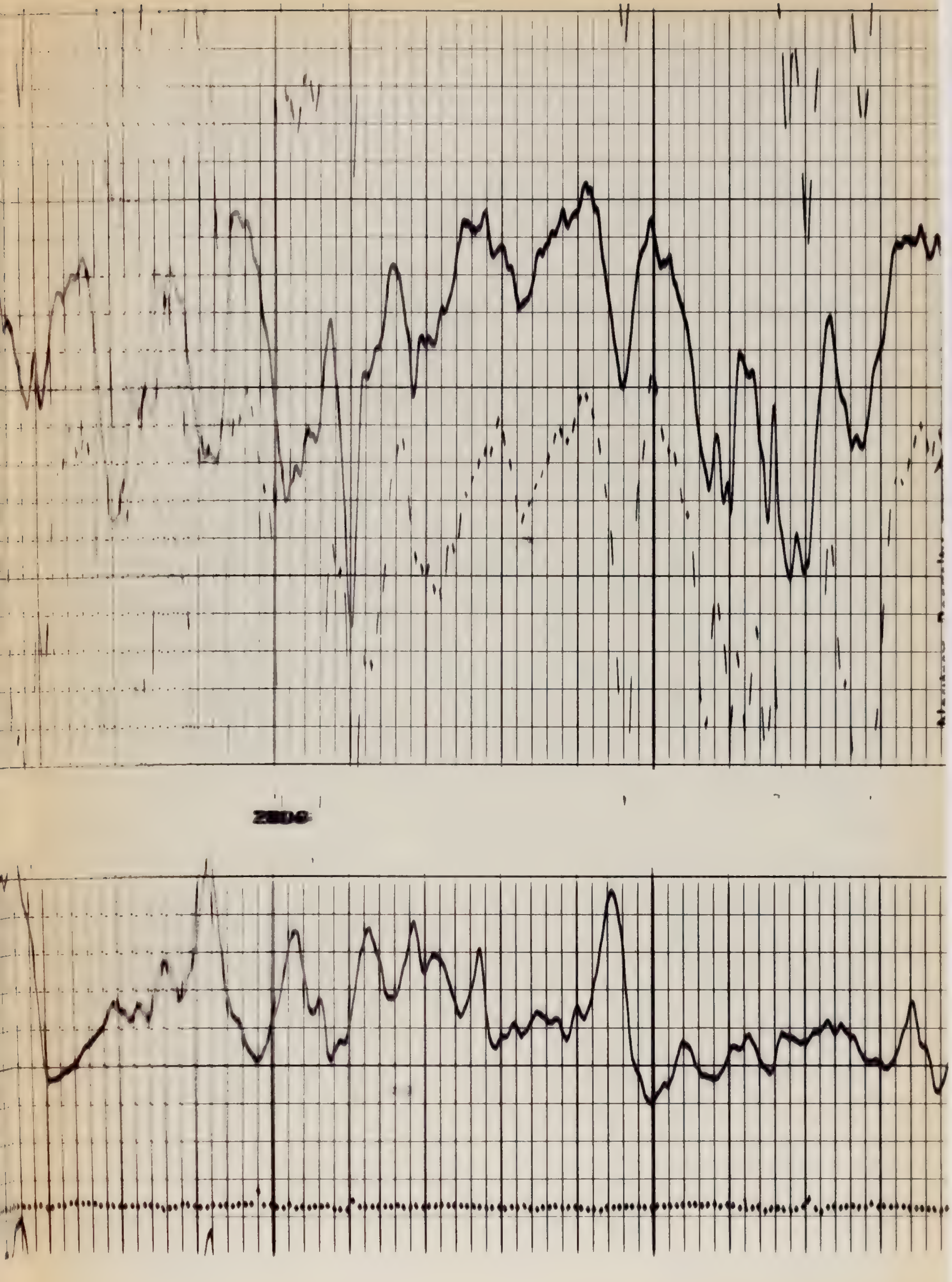

1400

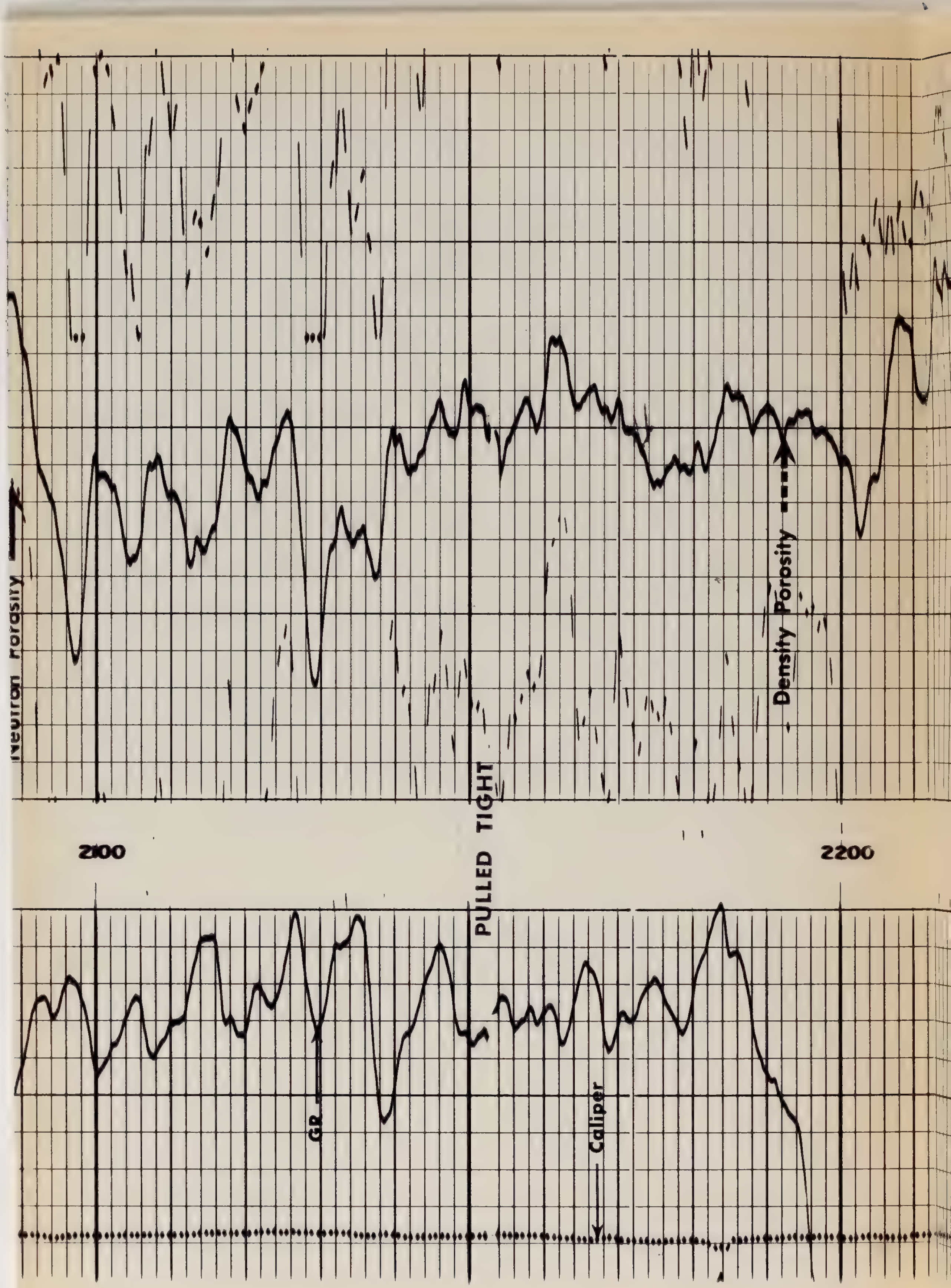

1500

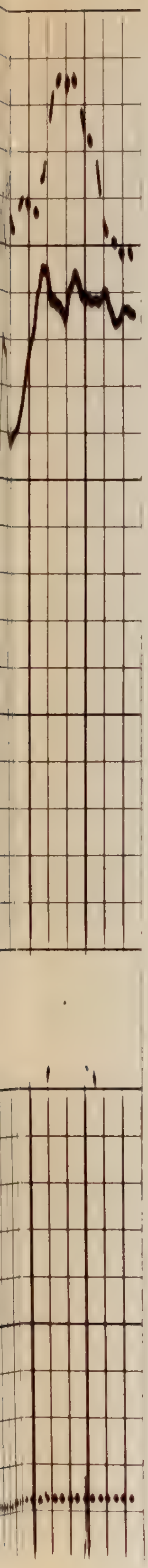

1600
1700

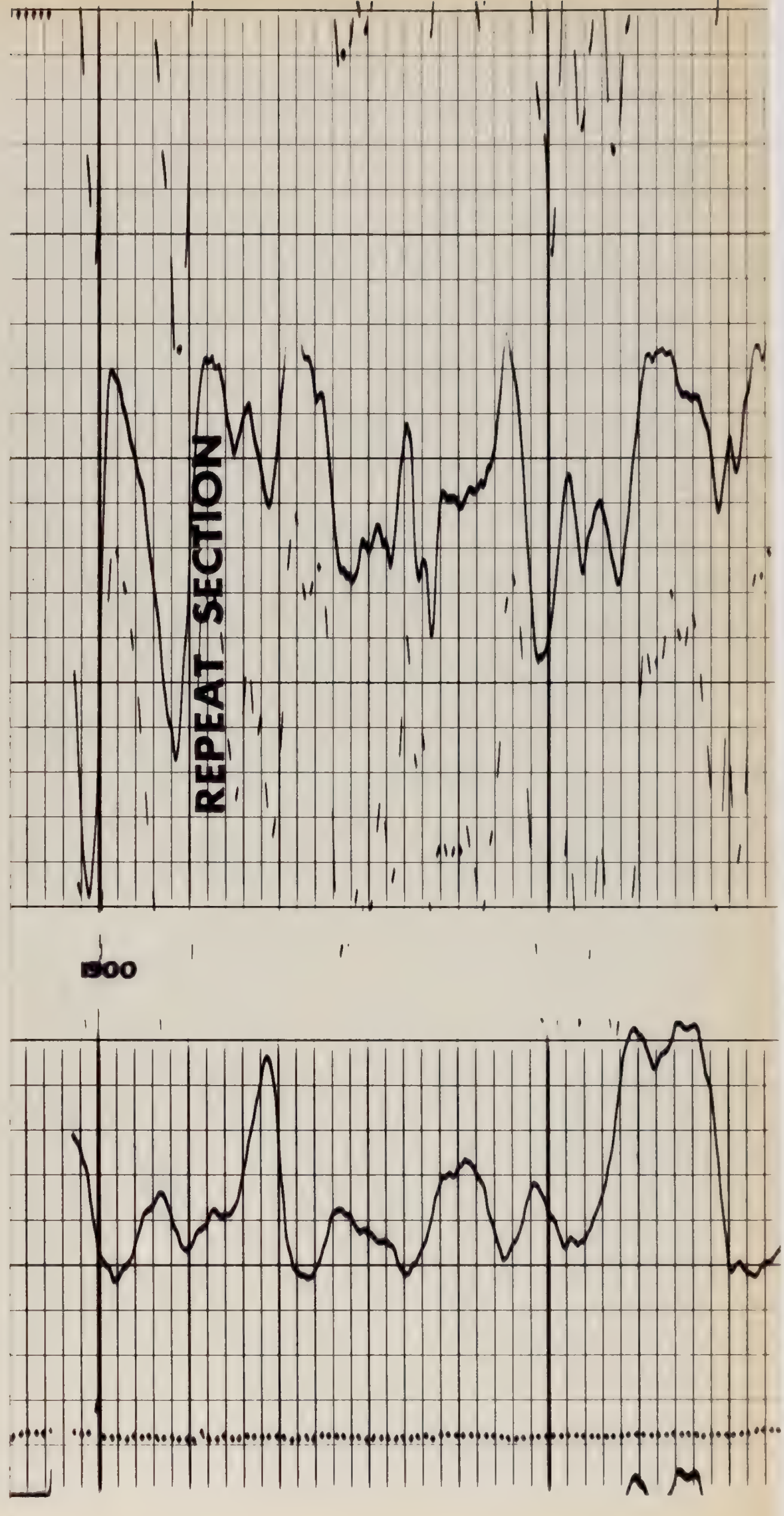

1800


1900

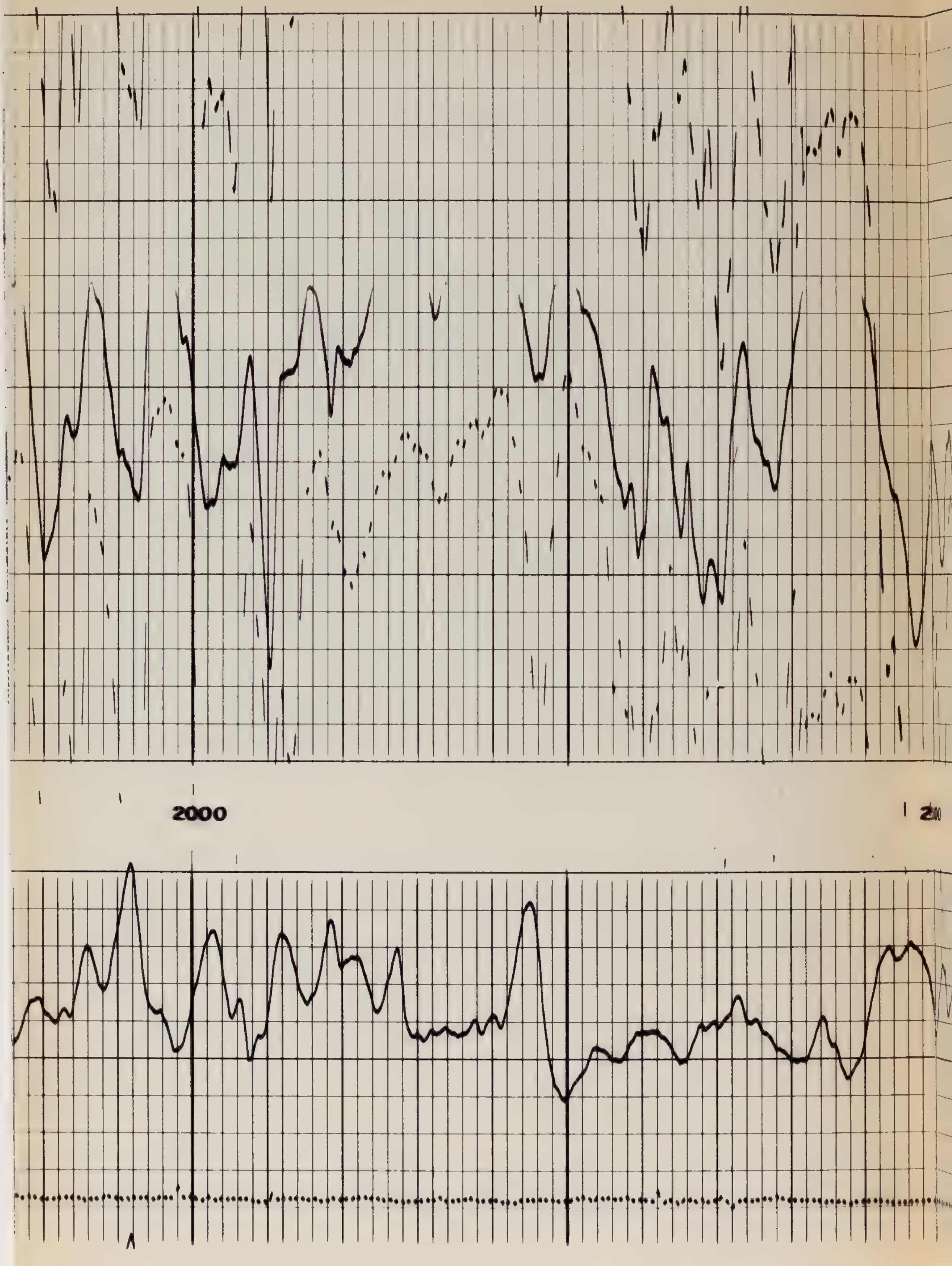

ZERO

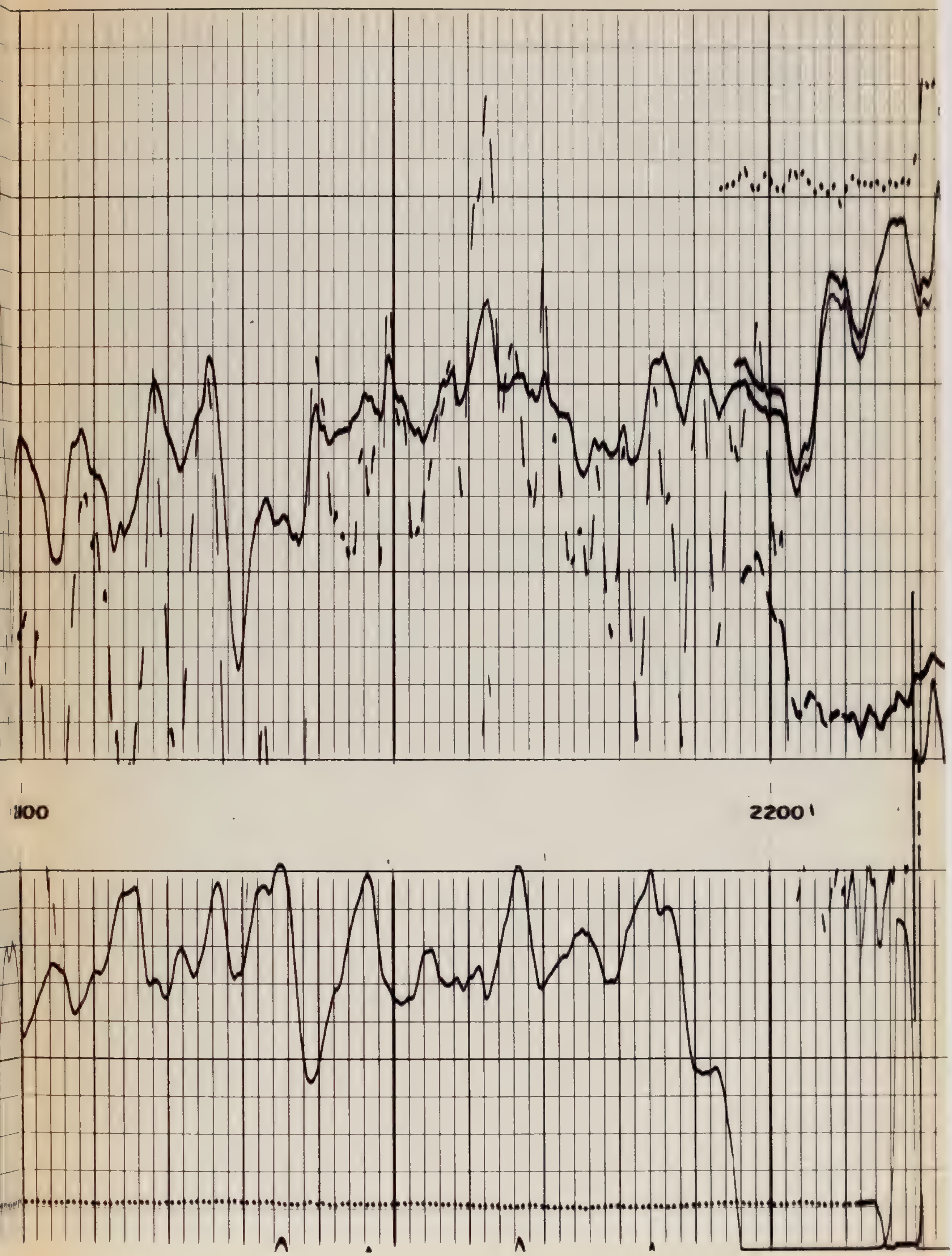

Neutron Porosity
Density Porosity
2100
PULLED TIGHT
2200
GR
Caliper

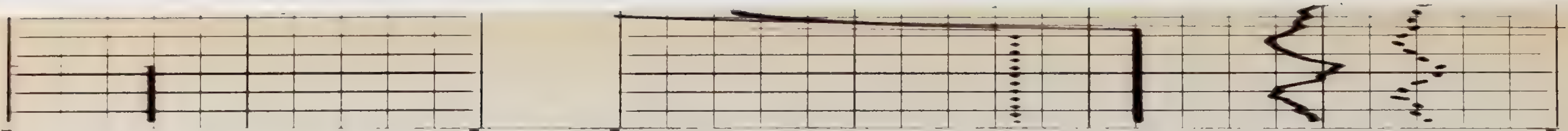




REPEAT SECTION
1900


2000
2000


100
2200



GAMMA RAY API UNITS	DEPTHS	NEUTRON POROSITY INDEX % LIMESTONE MATRIX
0 — 150 150 — 300		60 — 45 — 30 — 15 — 0
CALIPER HOLE DIAM. IN INCHES		**DENSITY POROSITY INDEX %** LIMESTONE MATRIX
5 — 15		60 — 45 — 30 — 15 — 0

COMPANY THE ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #6

SORGHUM GULCH

SCHL. FR 2219
SCHL. TD 2220
DRLR TD 2220
Elev:
KB
DF

Well SORGHUM GULCH #5

FIELD SORGHUM GULCH

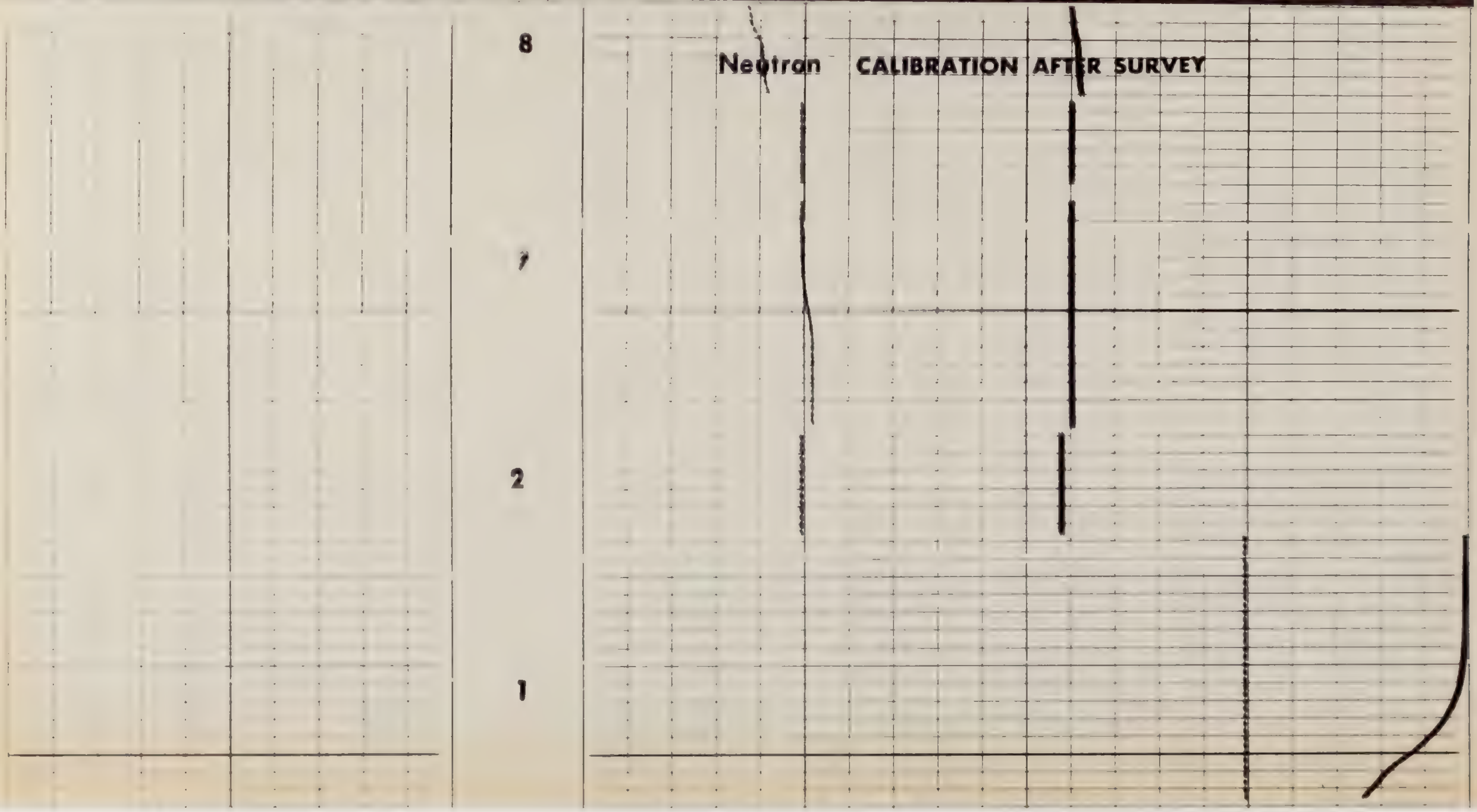
COUNTY RIO BLANCO STATE COLORADO

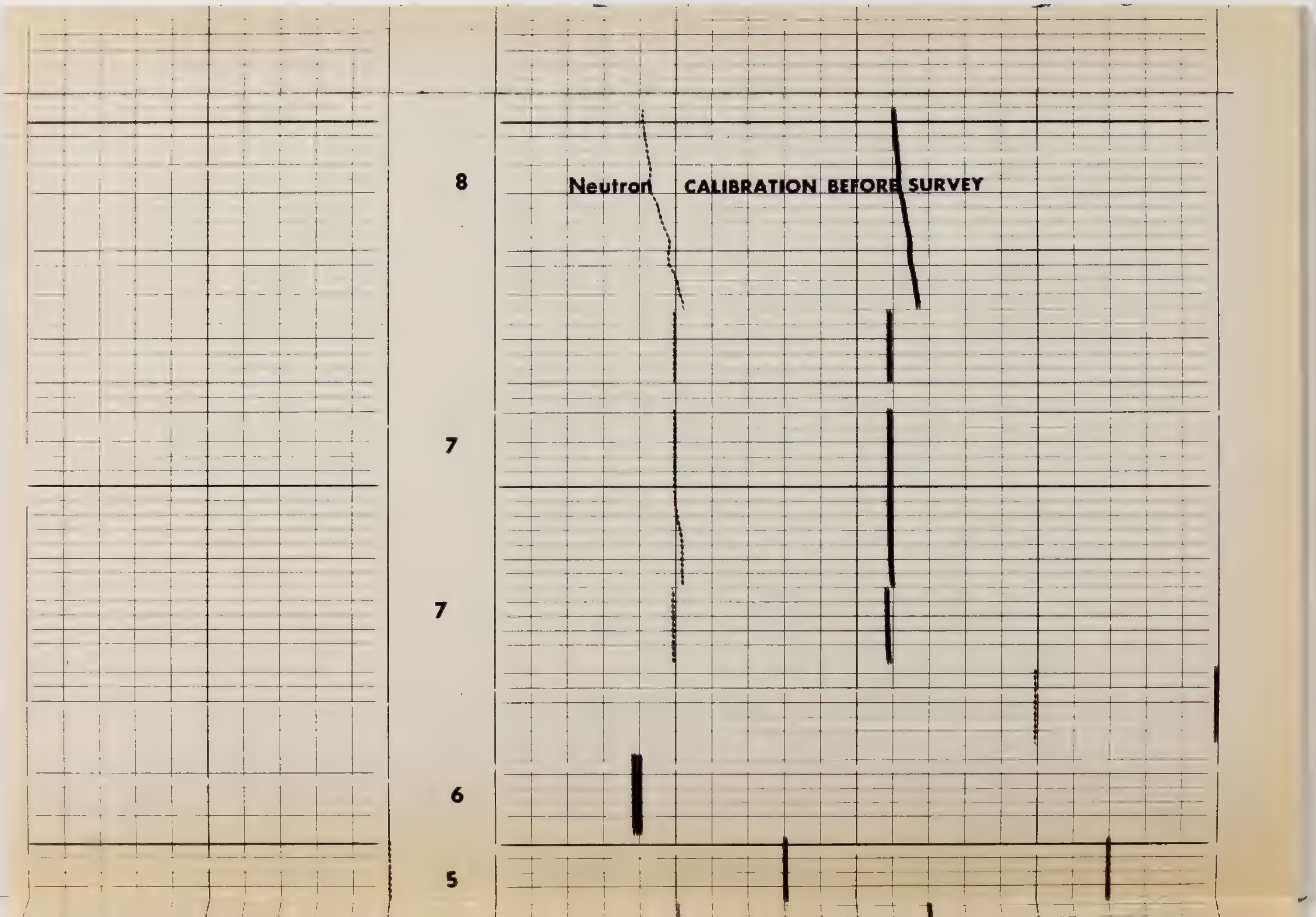
KB

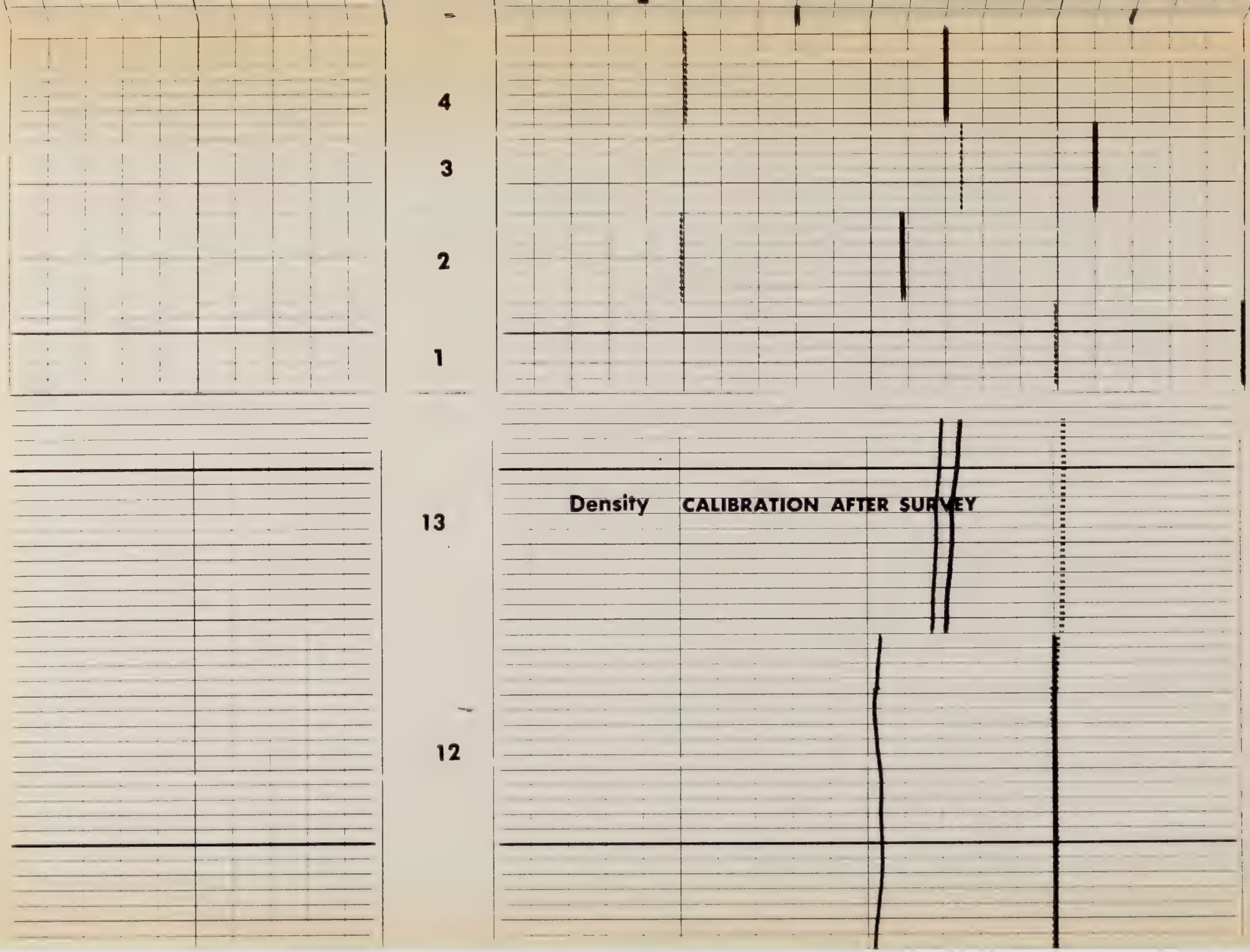
DF

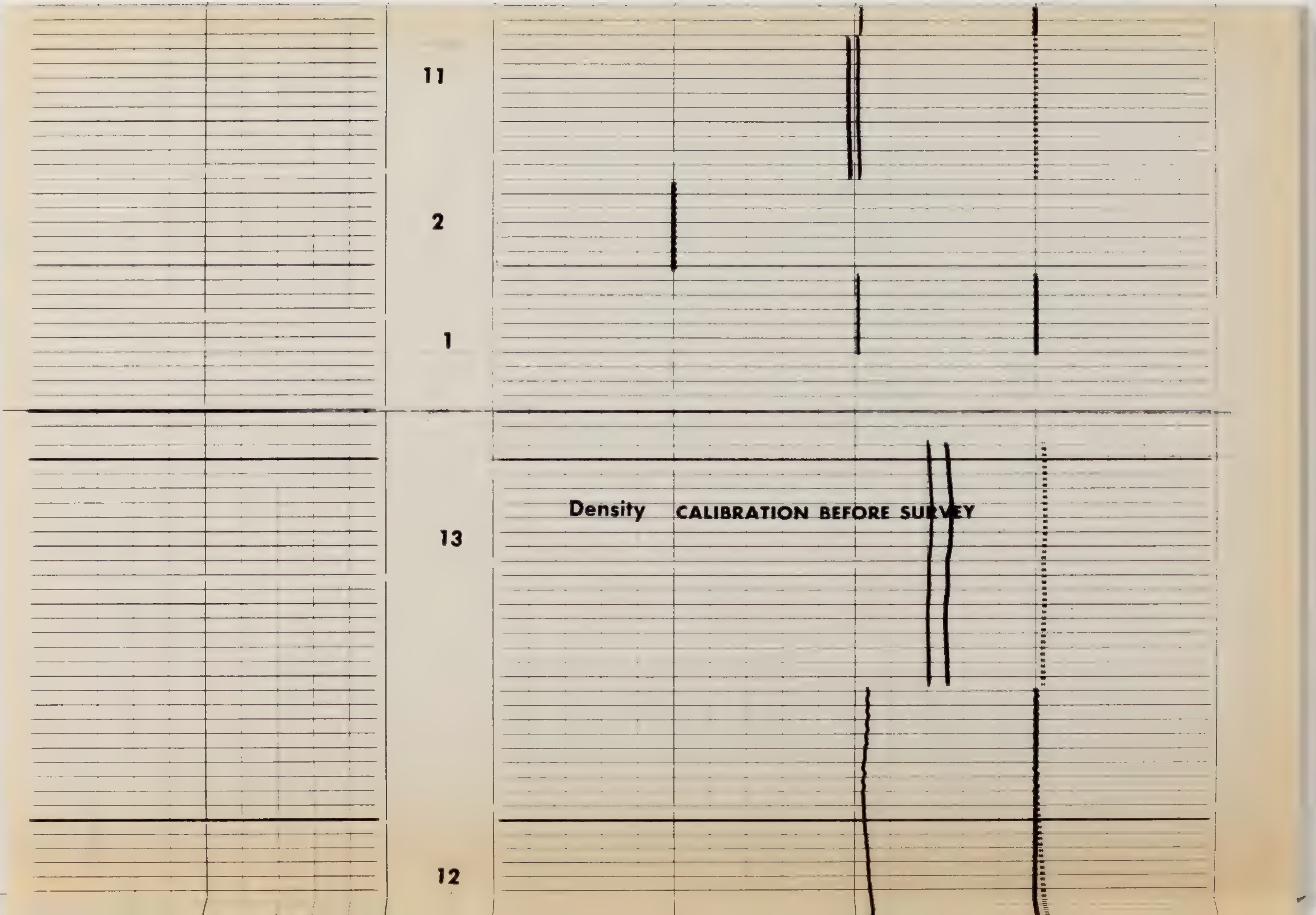
GL 6888

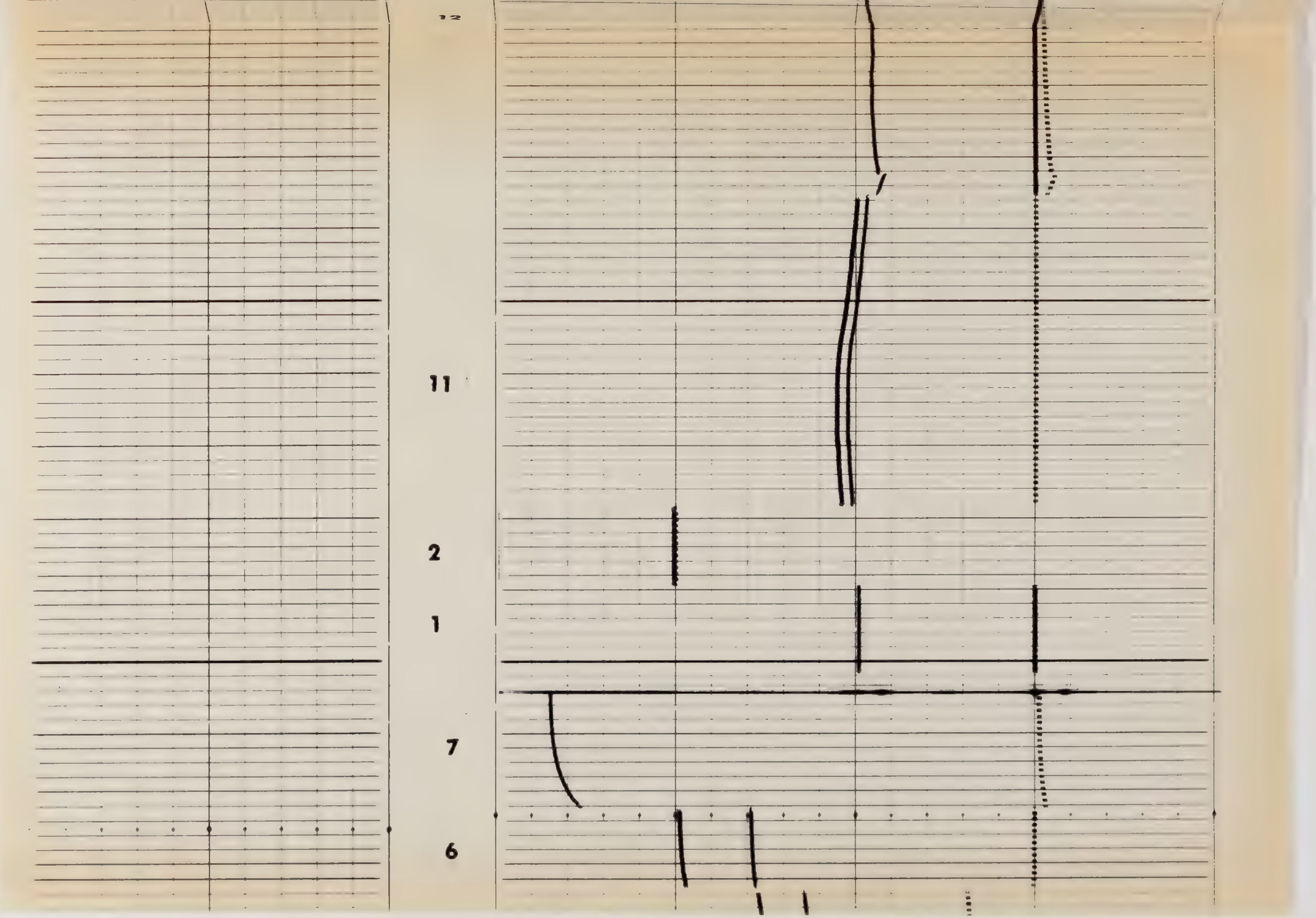
CALIBRATION RECORD

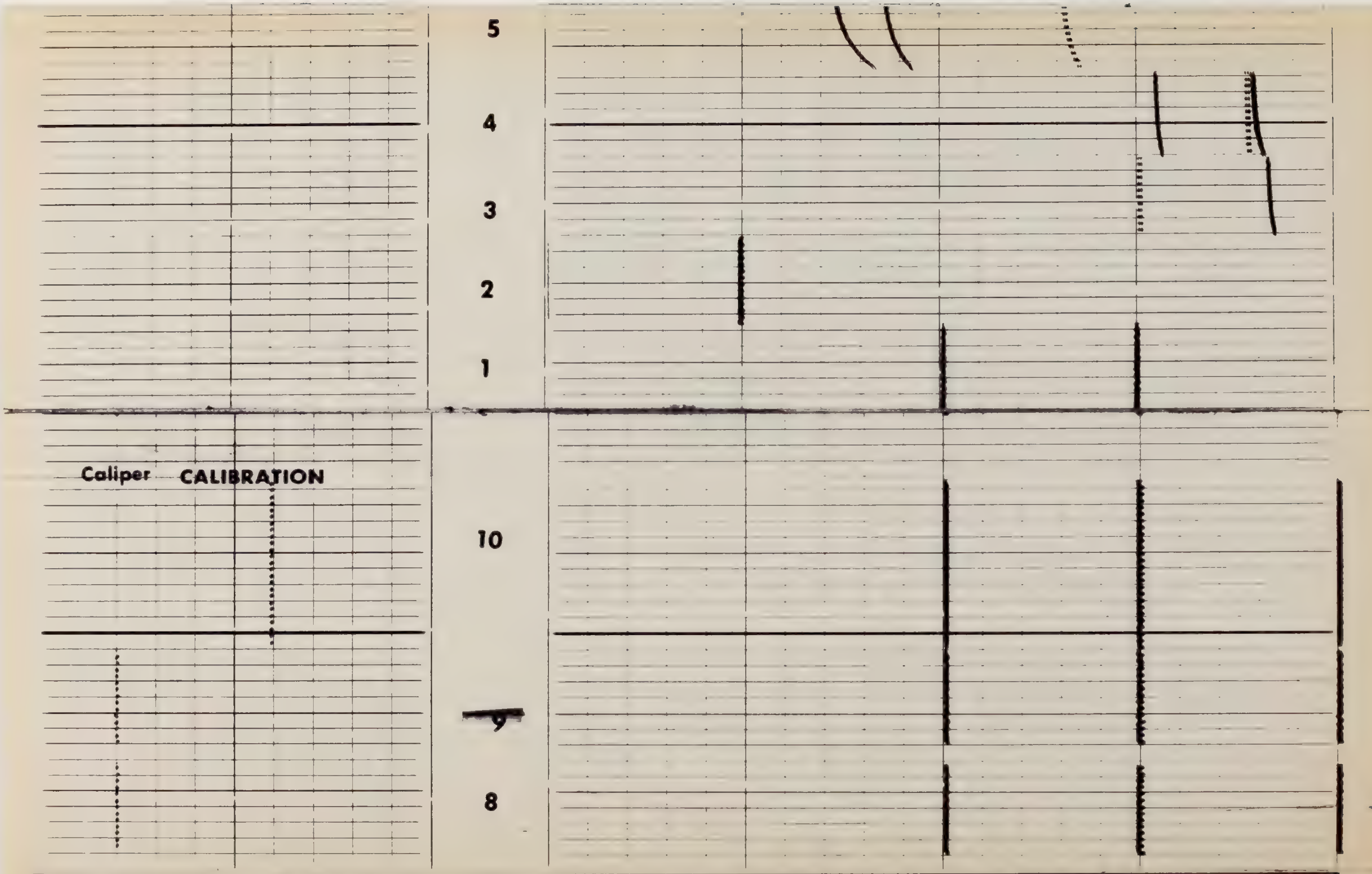



8
Neutron
CALIBRATION BEFORE SURVEY
7
7
6
5


4
3
2
1
13
Density CALIBRATION AFTER SURVEY
12


11
2
1
13
12
Density
CALIBRATION BEFORE SURVEY


12
11
2
1
7
6



CALIBRATION RECORD

COMPANY THE ATLANTIC RICHFIELD COMPANY SCHL. FR 2219

CALIBRATION RECORD

COMPANY THE ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #6

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 2219

SCHL. TD 2220

DRLR TD 2220

Elev:

KB

DF

GL 6888

SWS-1874-B

COUNTY RIO BLANCO, COLO.

Per
Log
Dri

Dat
Run
Dep
Dep
Btm
Top
Cas
Cas
Cas
Casi
Casi
Bit S
Type
De
Time
BHT
Equ
Reco

Schlumberger

TEMPERATURE LOG

COUNTY RIO BLANCO, COLO.
FIELD or LOCATION SORGHUM GULCH
WELL SORGHUM GULCH #6
COMPANY ATLANTIC RICHFIELD

COMPANY THE ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #6

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

LOCATION
2523' FSL & 2251'FW

Sec. 7 Twp. 3S Rge. 96W

Other Services:
DIL
FDC-CNL-GR
BHC-GR

Permanent Datum: GL ; Elev.: 6888
Log Measured From GL, 0 Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B.
D.F.
G.L. 6888

Date	8/22/74		
Run No.	ONE		
Depth—Driller	2220		
Depth—Logger	2220		
Btm. Log Interval	2220		
Top Log Interval	456		
Casing—Driller	8-5/8 @ 59	@	@
Casing—Logger			
Casing Size 1	To	To	To
2	To	To	To
Casing Weight 1			
2			
Casing Thickness 1			
2			
Bit Size 1	To	To	To
2	To	To	To
Type Fluid in Hole	WATER		
Dens. Visc.			
Time Since Circ.	10 HOURS& 15 MIN		
BHT	104		
Equip. Location	5602 GJ		
Recorded By	BARGHOUTI		
ssed By	ELLARD:TAIT		

FOLD HERE

The well name, location and borehole reference data were furnished by the customer.

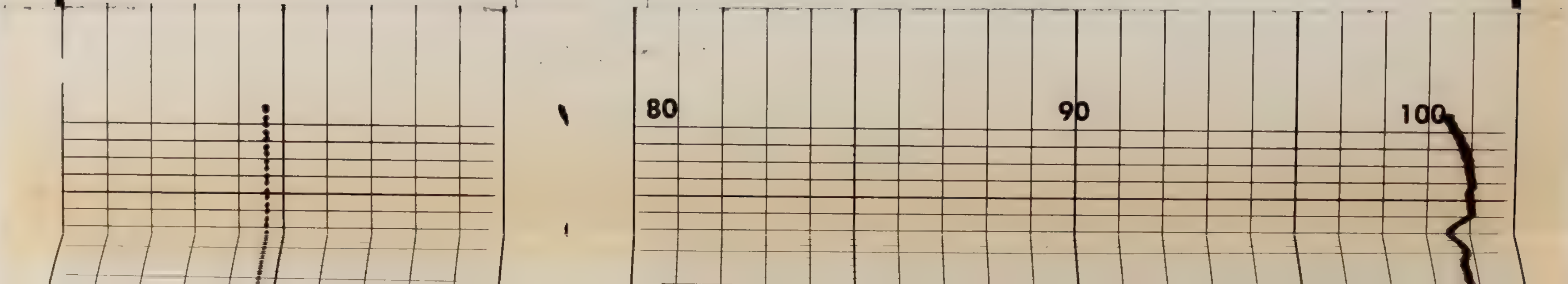
REMARKS:
SUNNY @ 1615 ON 8/22/74 10-1/4 HOURS SINCE CIRCULATION

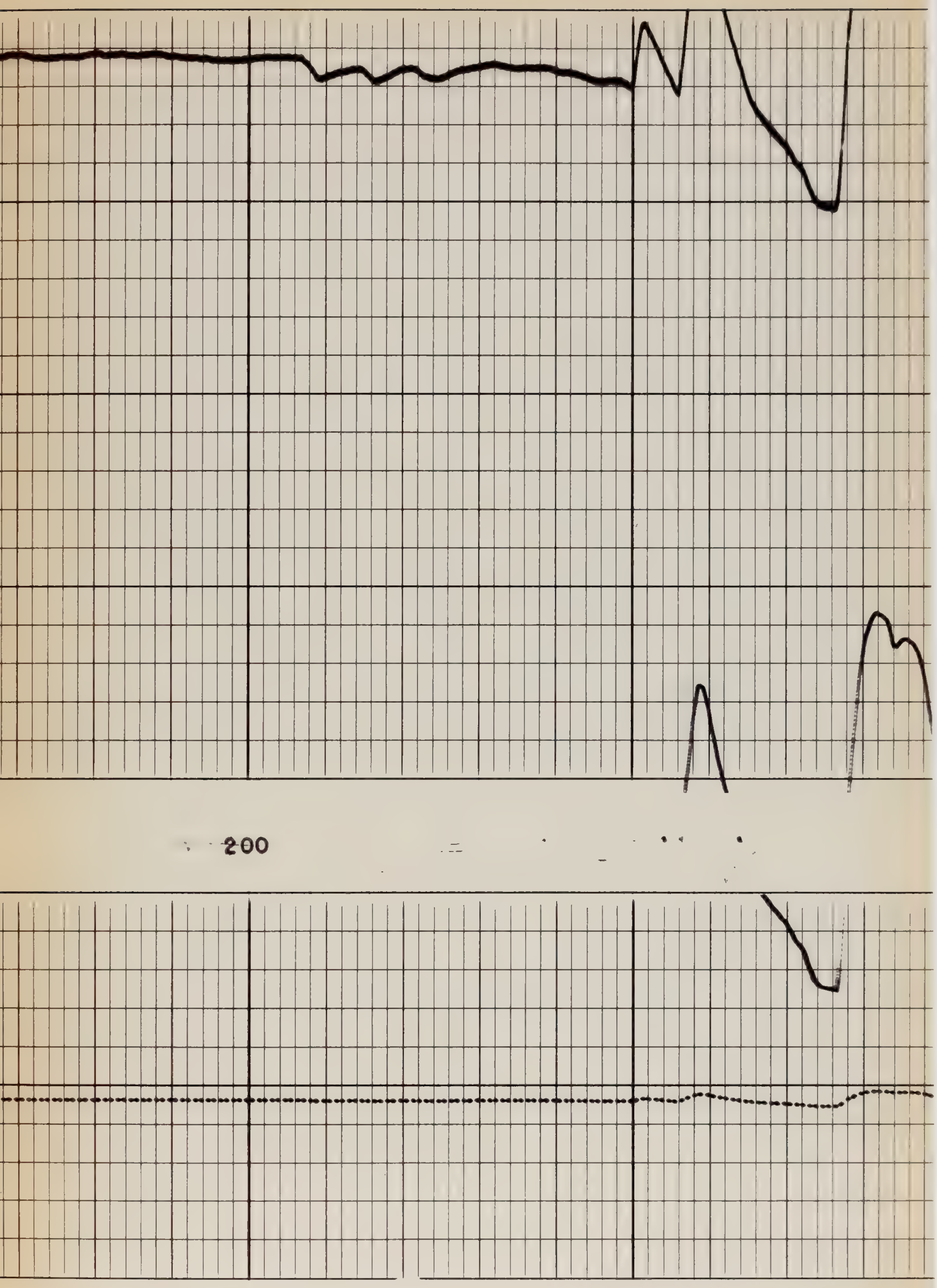
CEMENTATION DATA

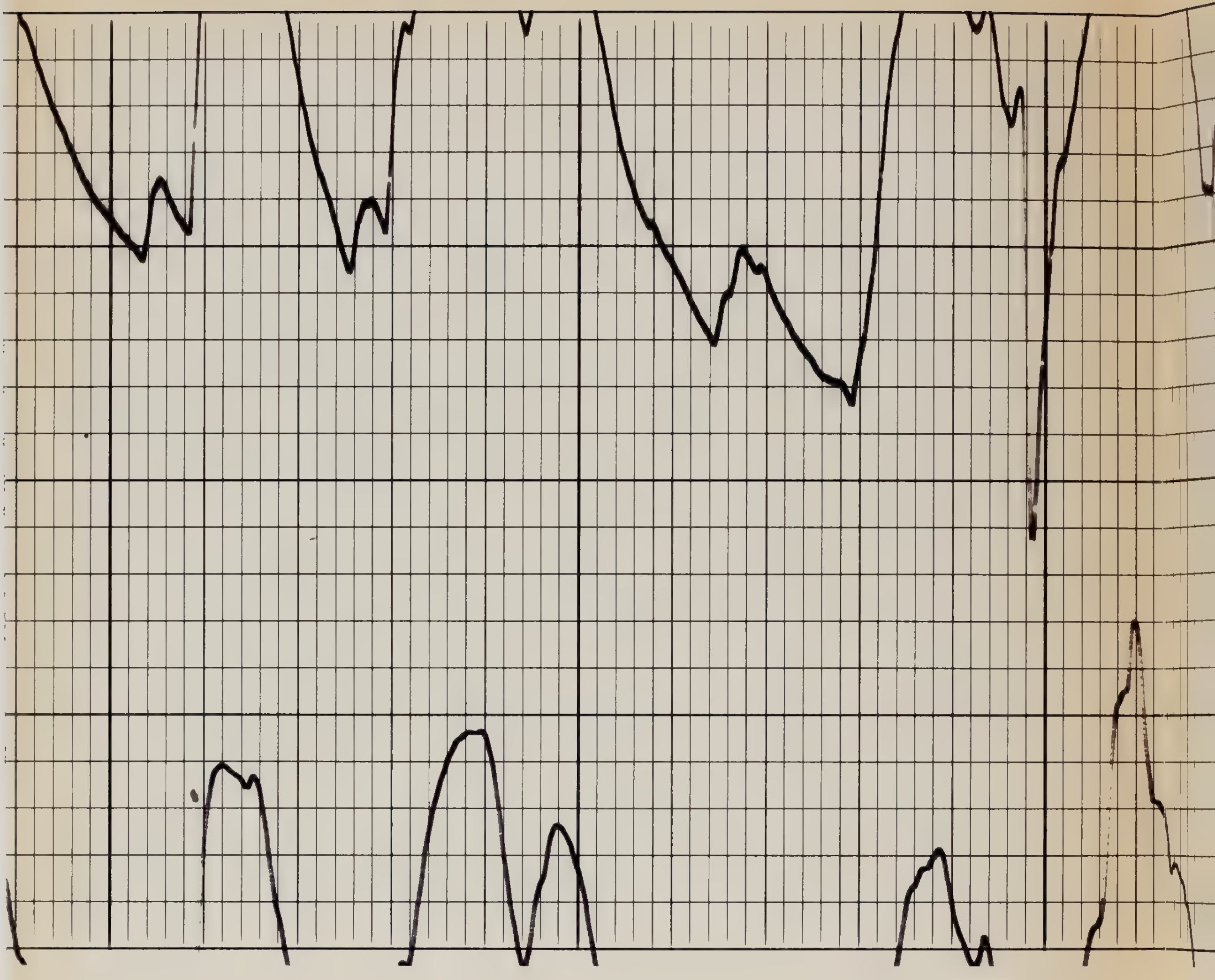
Date	Depth	Type of Cement	Nb of Sacks	Additives	Calculated Top

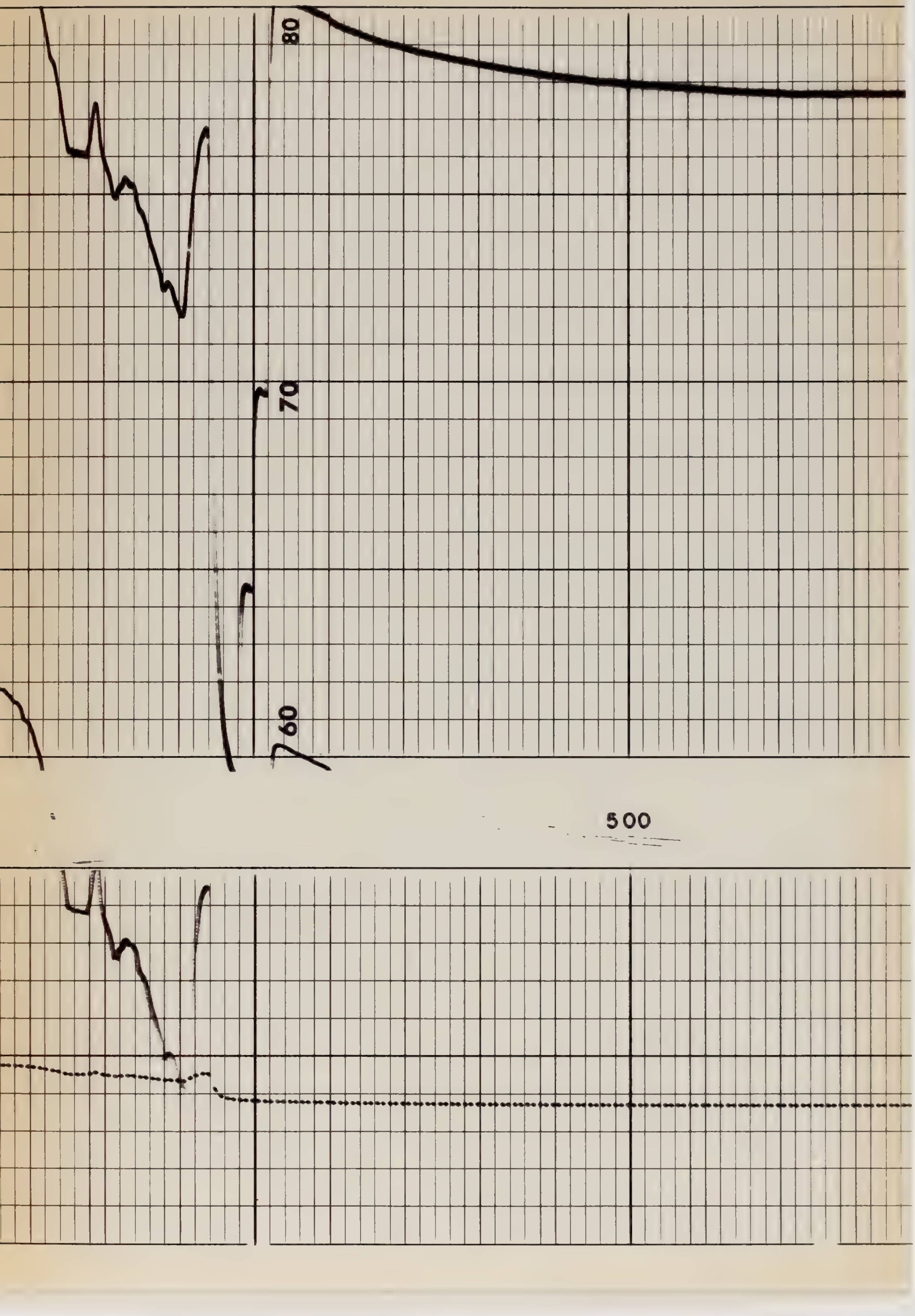
REDUCED SENSITIVITY
TEMPERATURE

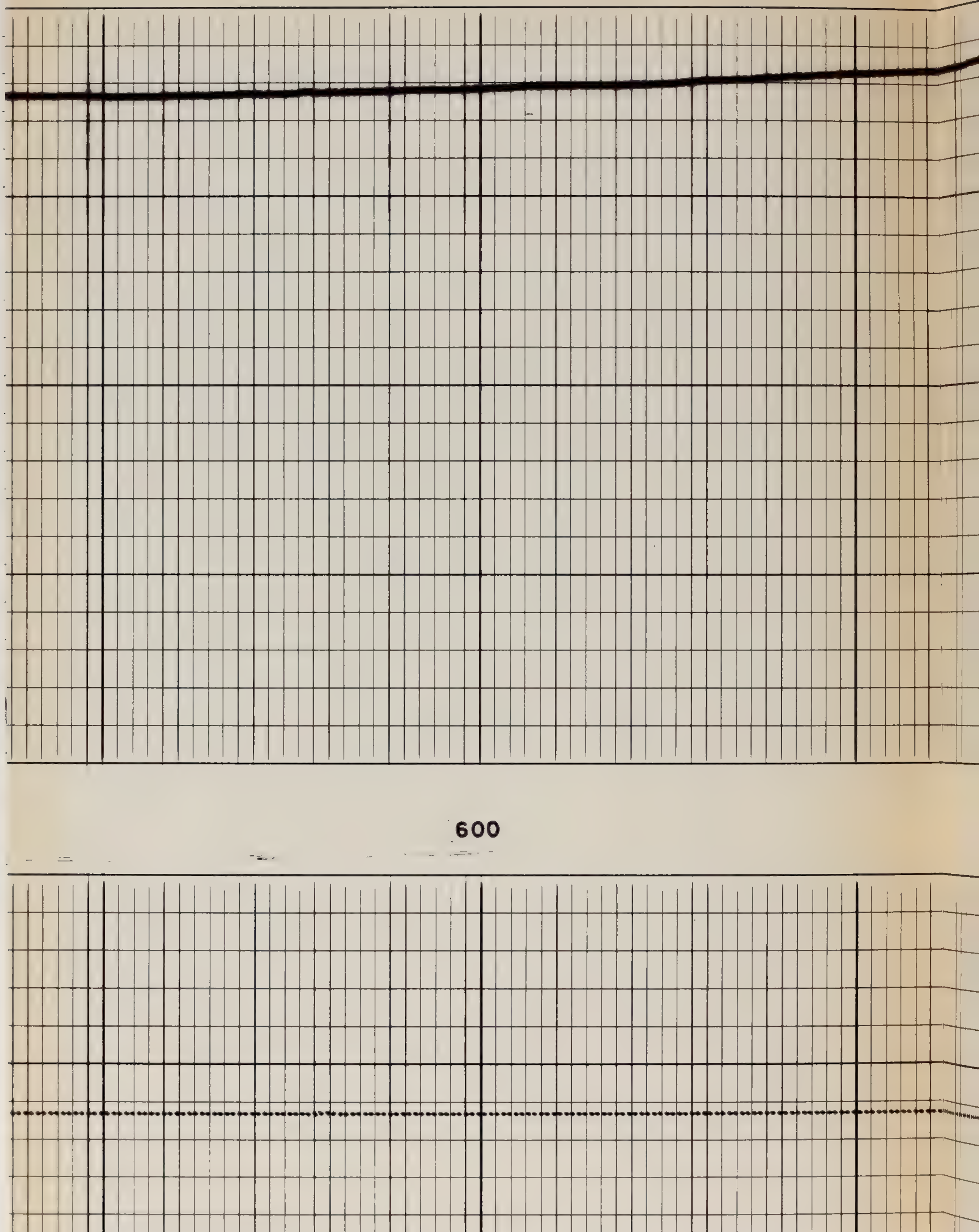
TEMPERATURE °F.

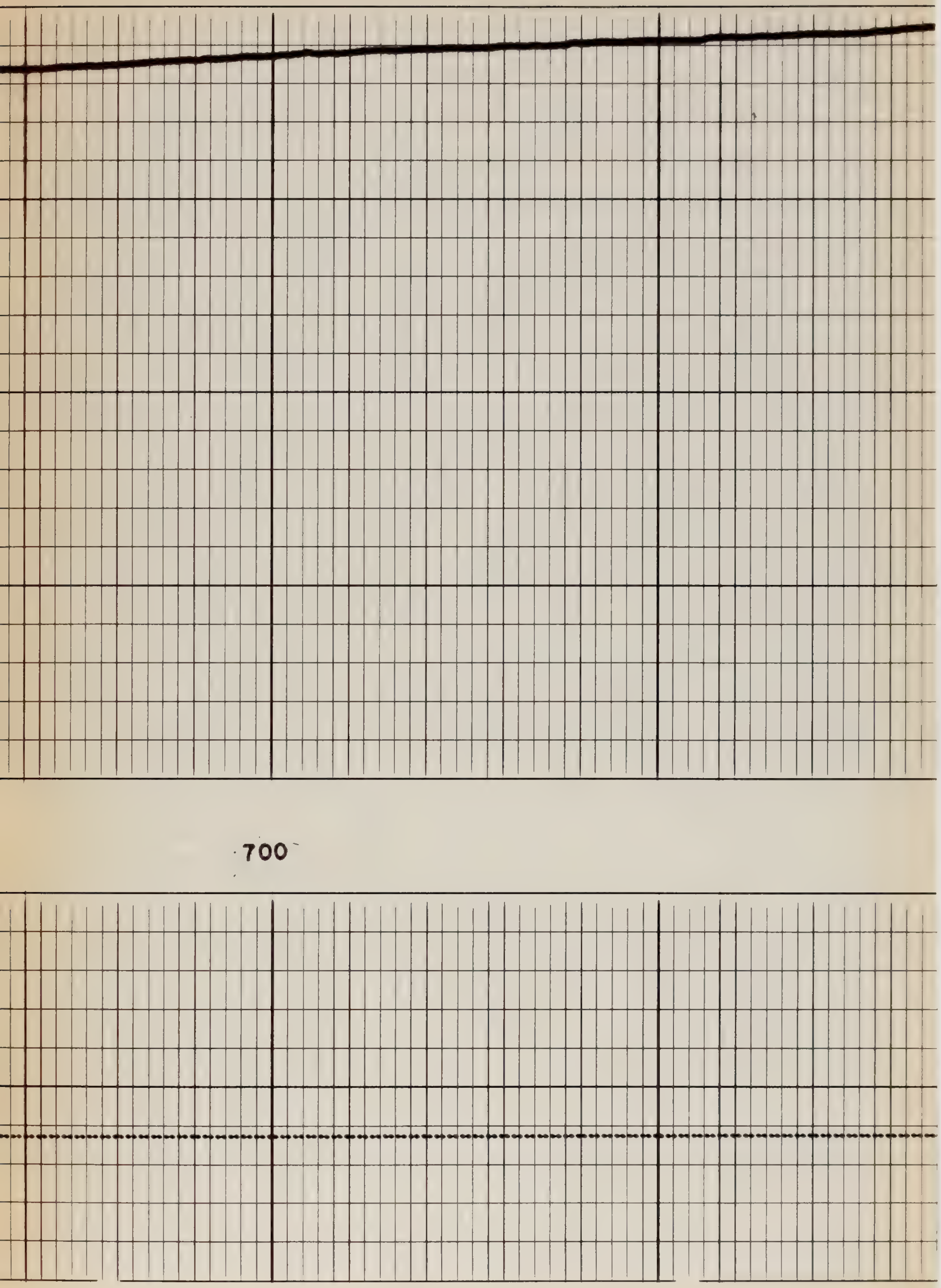


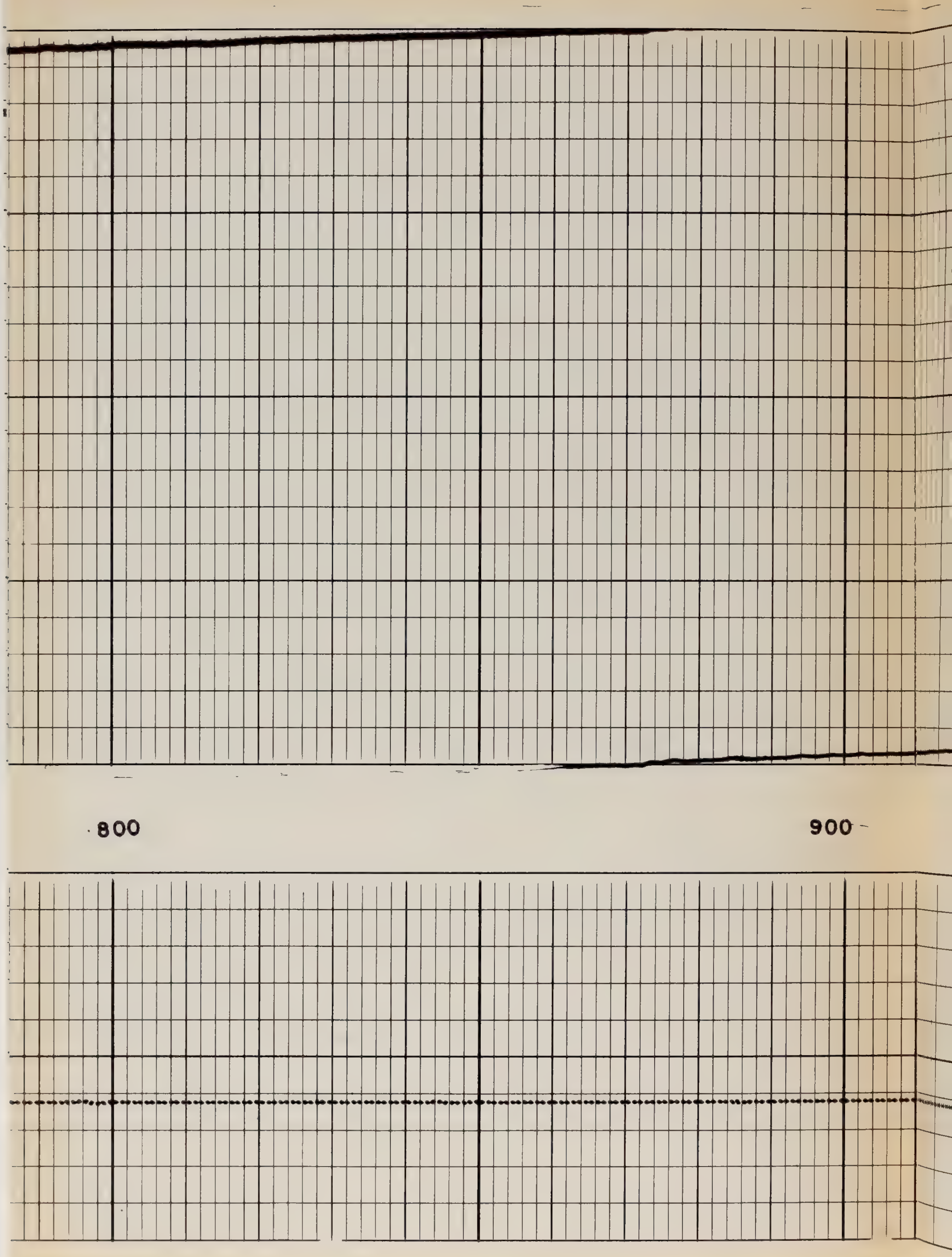

200

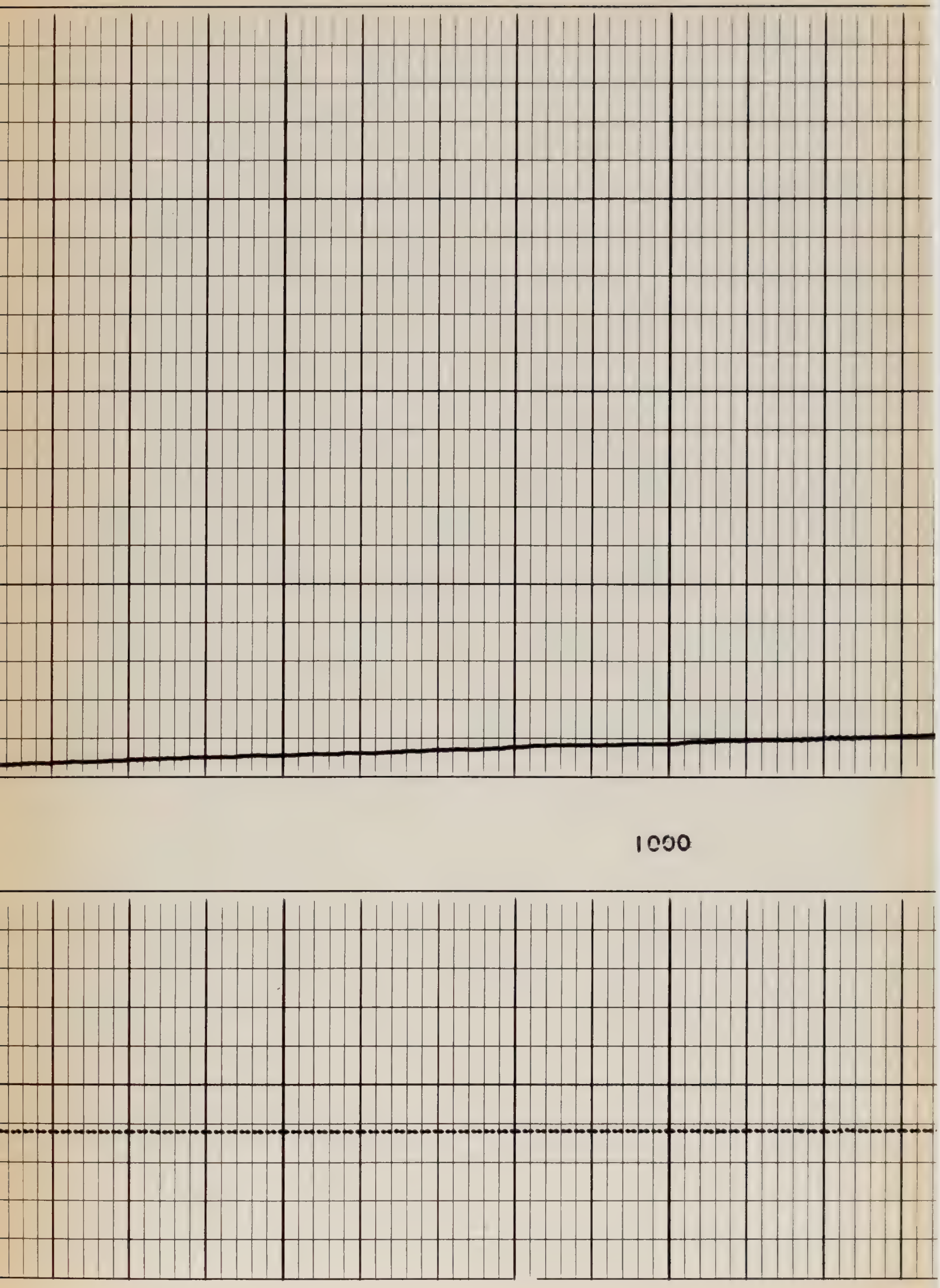

300
400


80
70
60
500


600


700


800
900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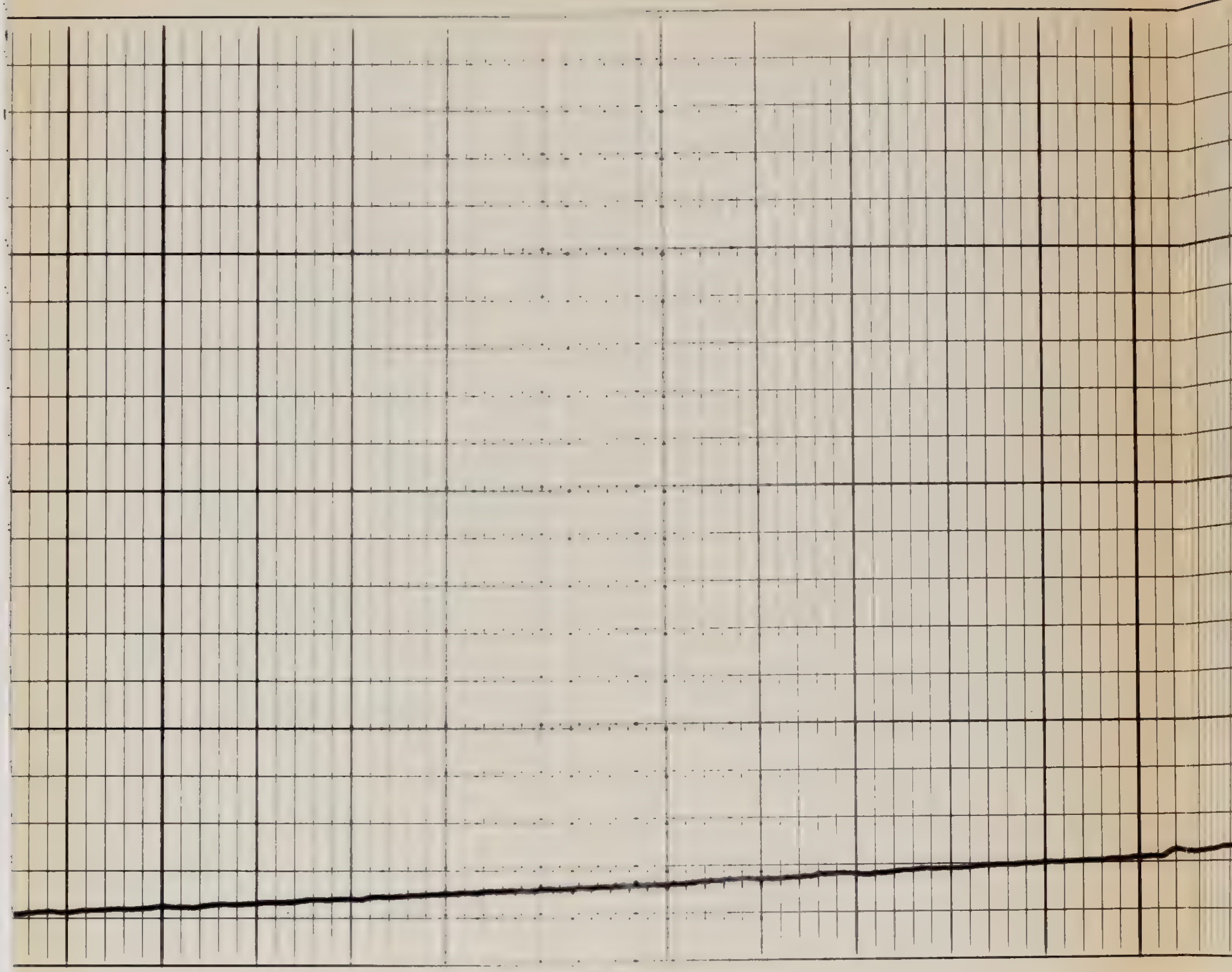
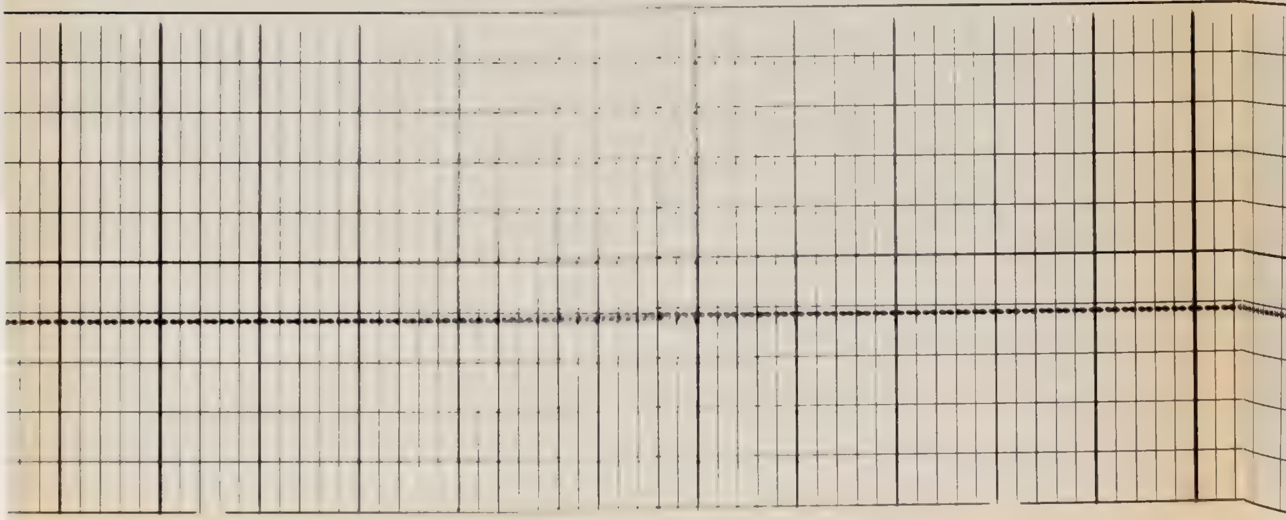
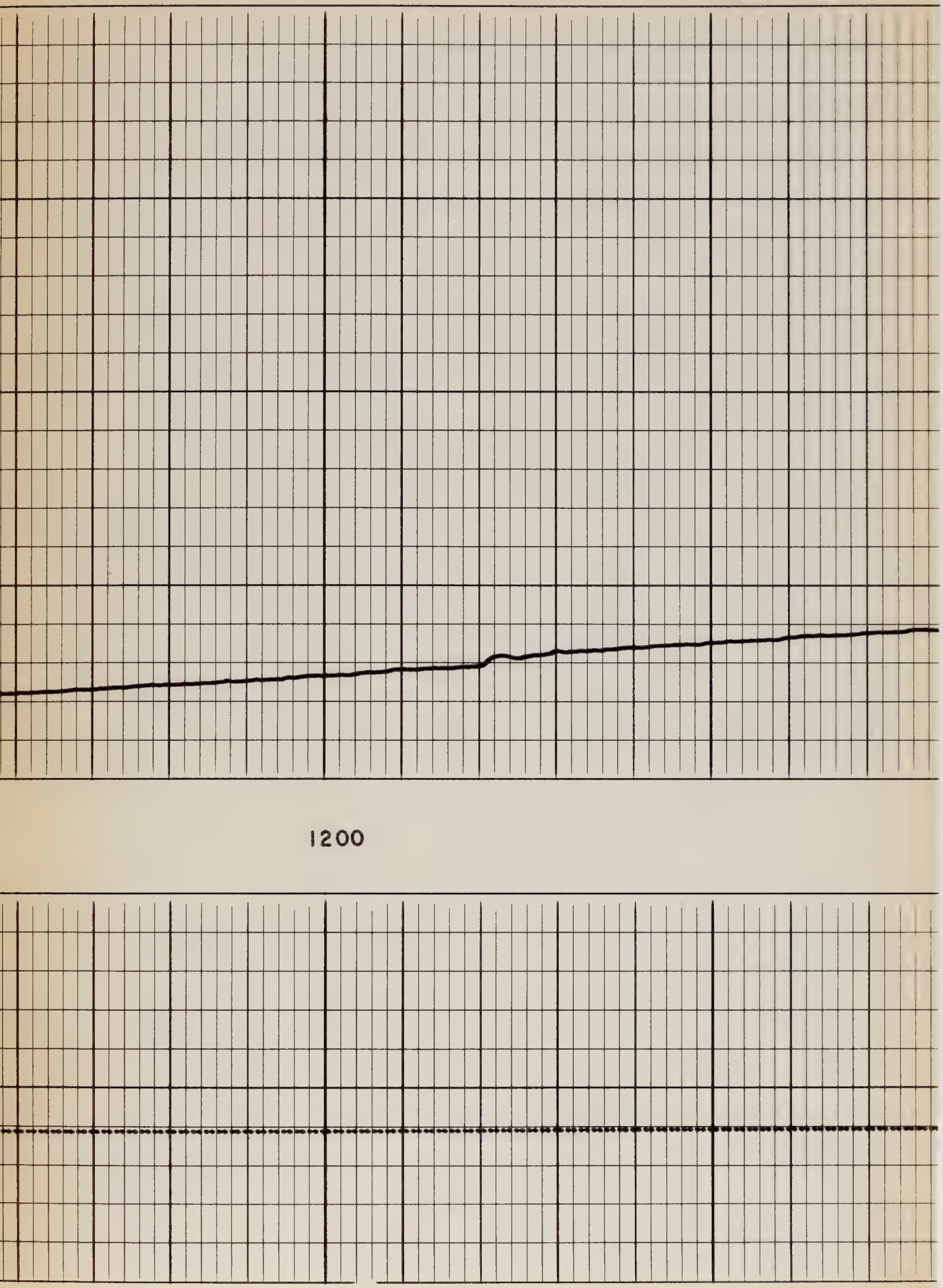


1100

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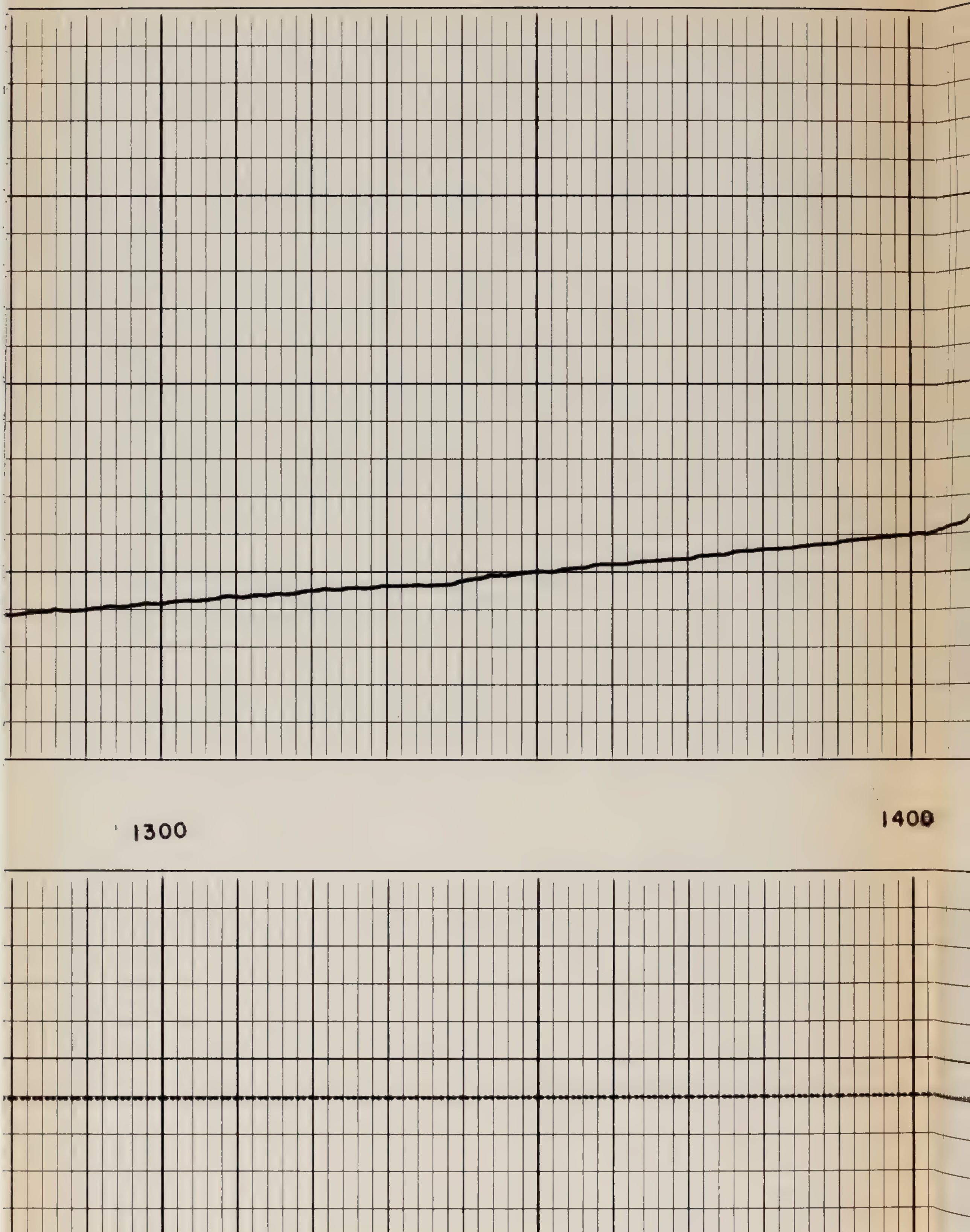
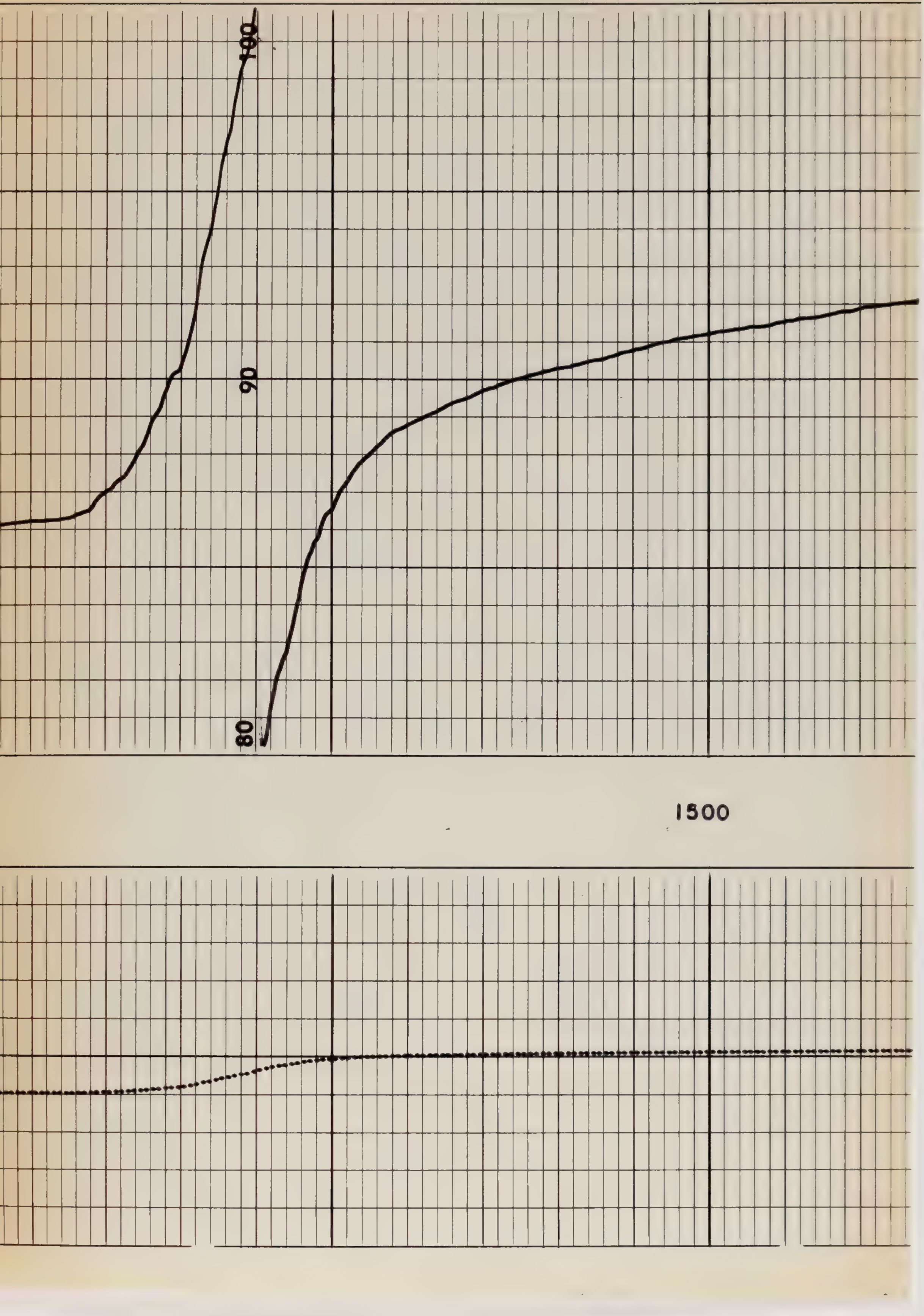
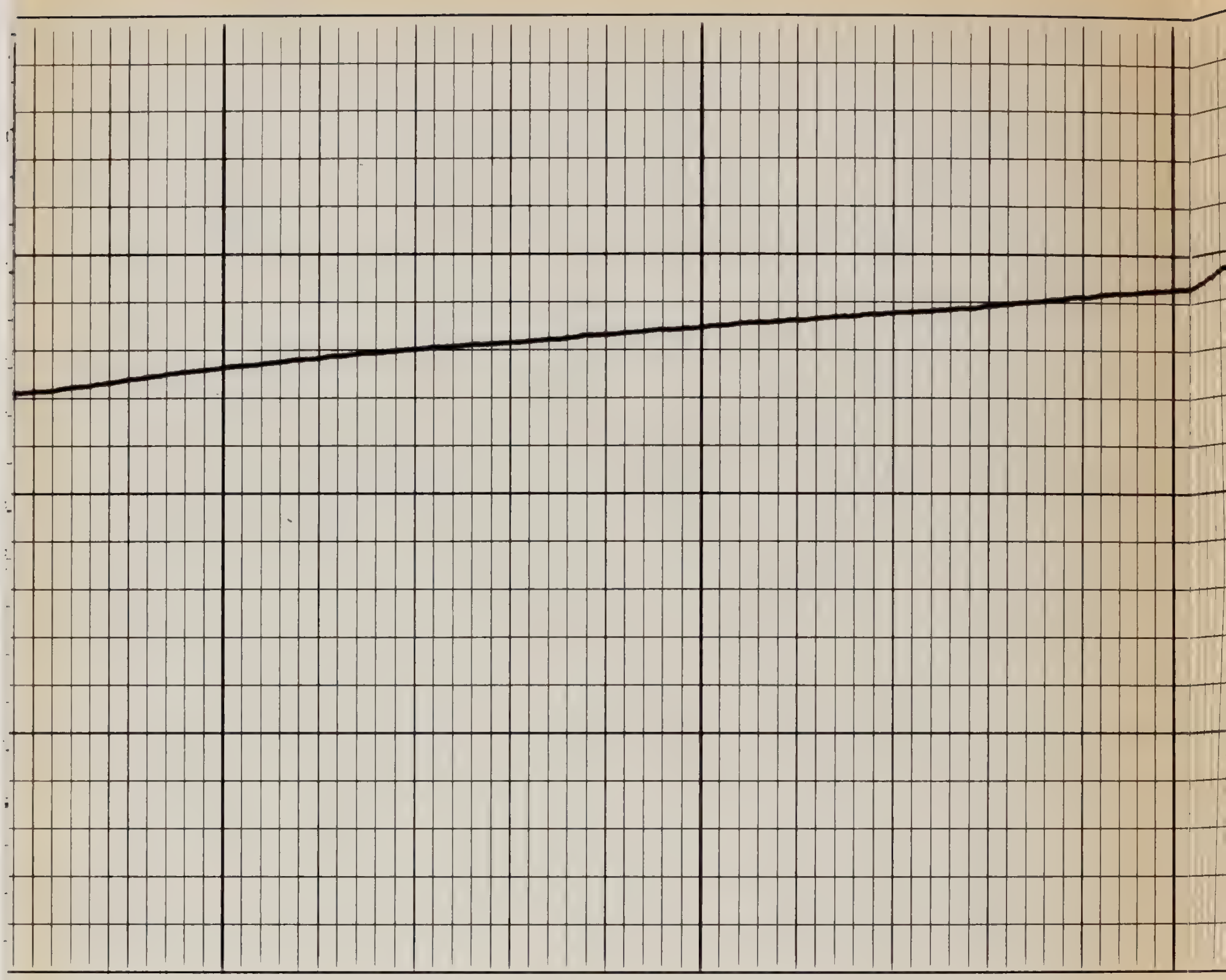
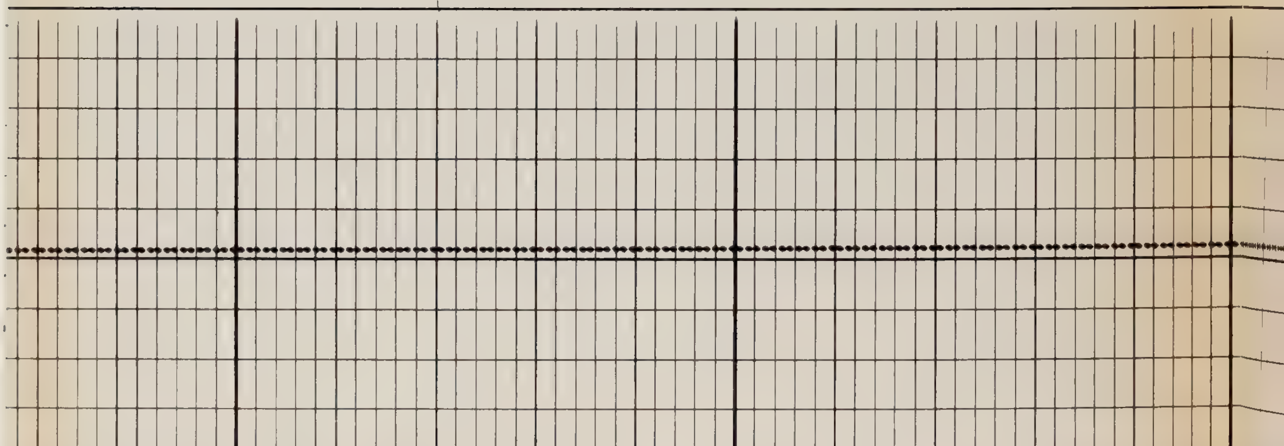
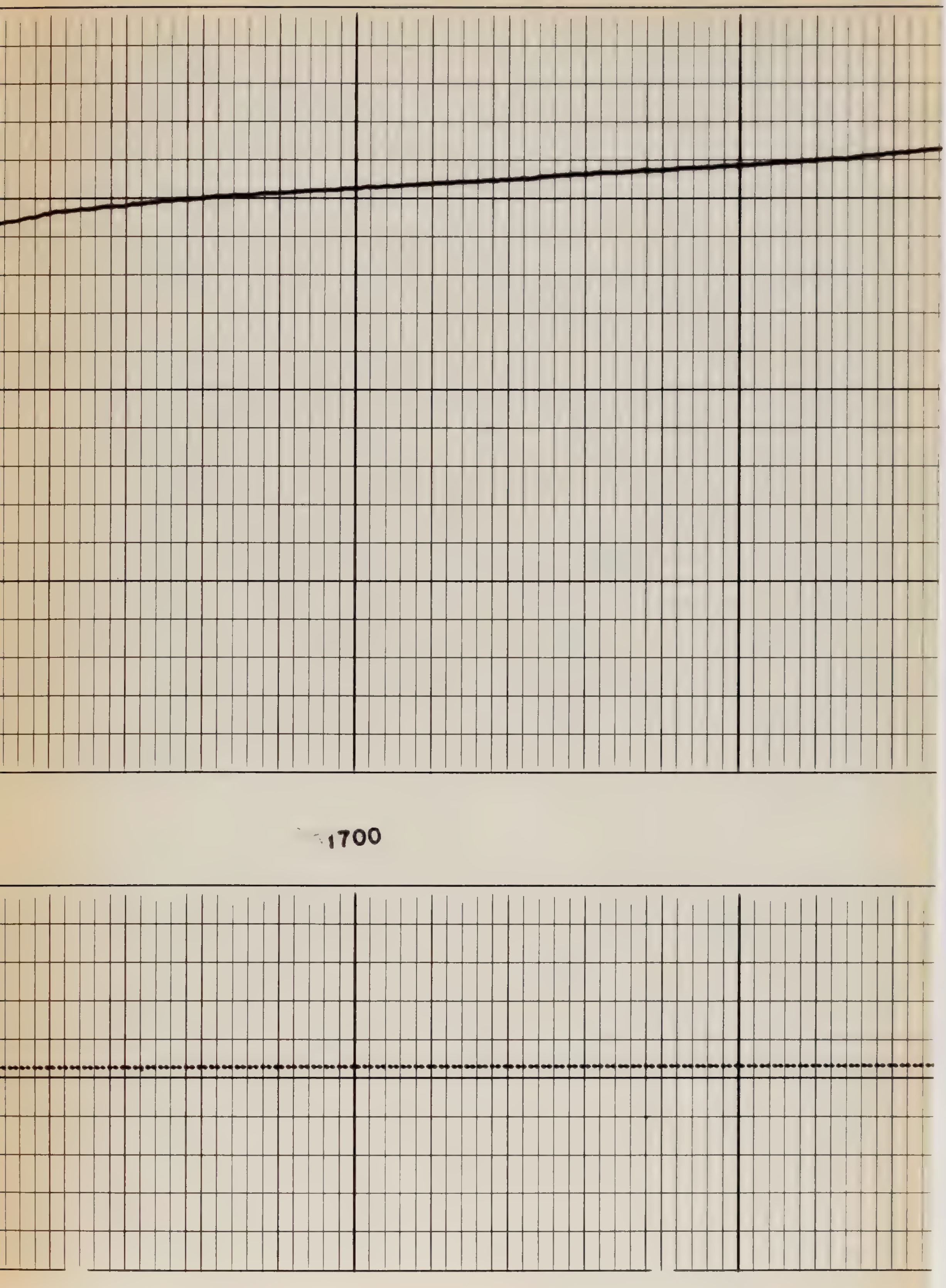

1300
1400

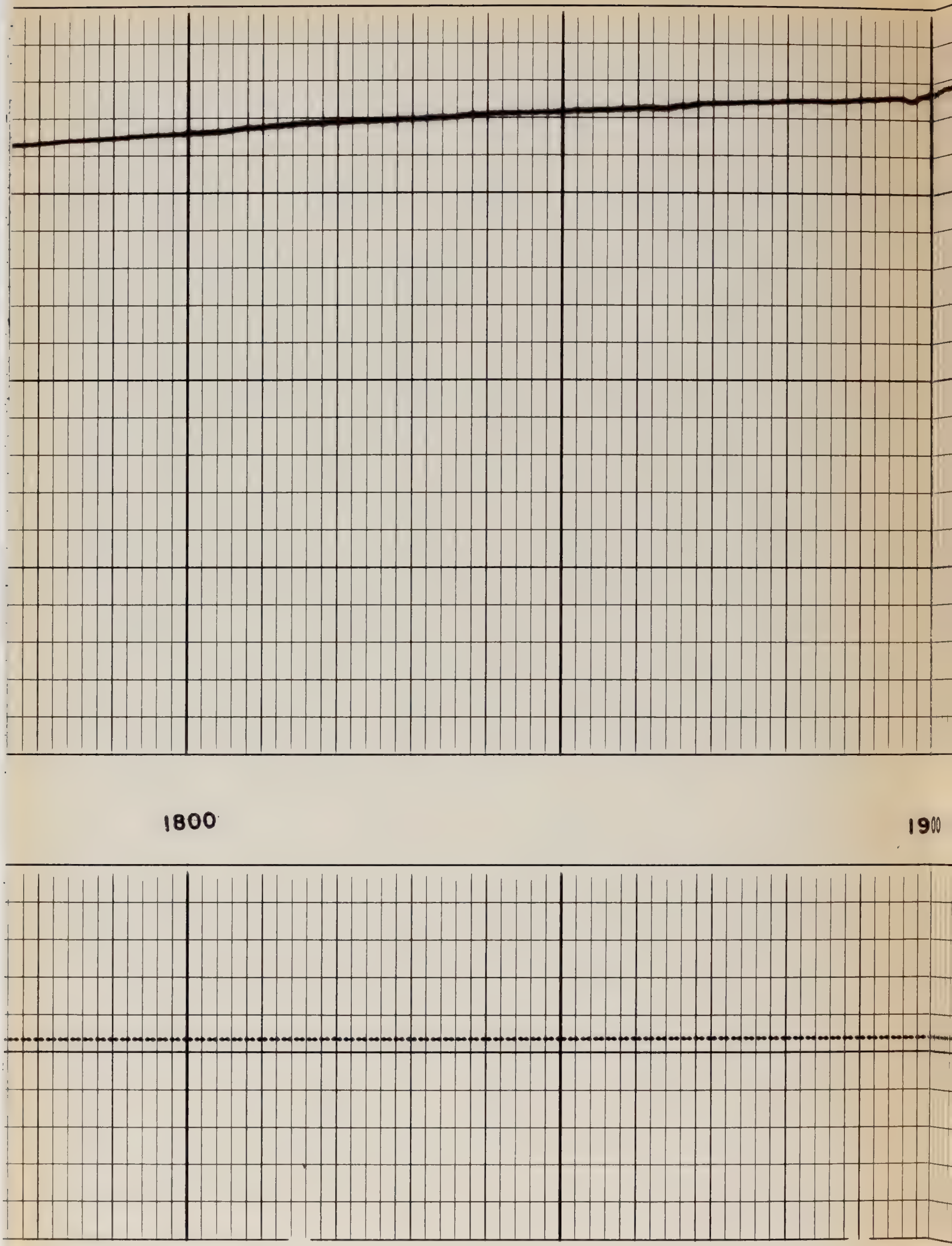

100
90
80
1500

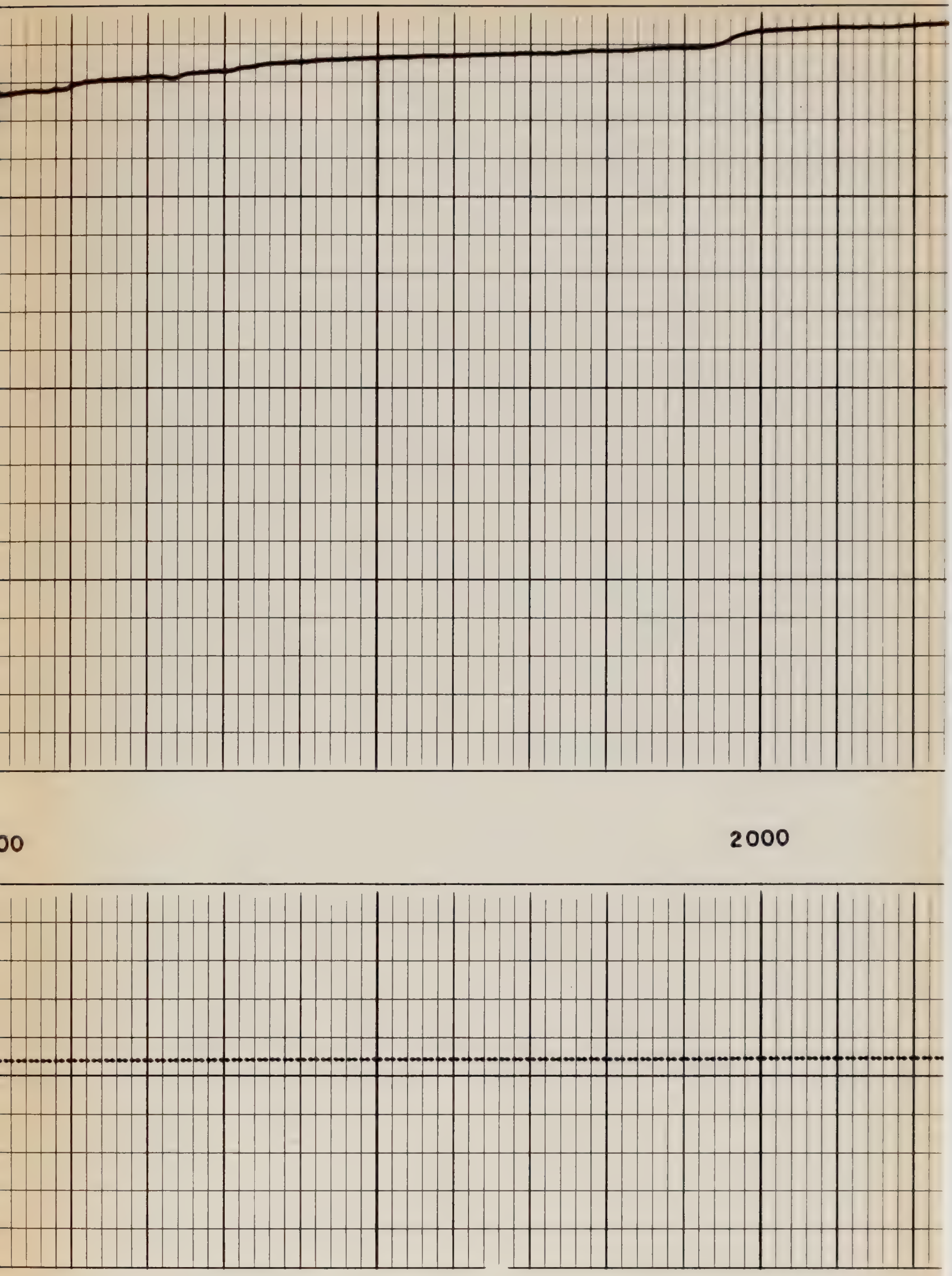


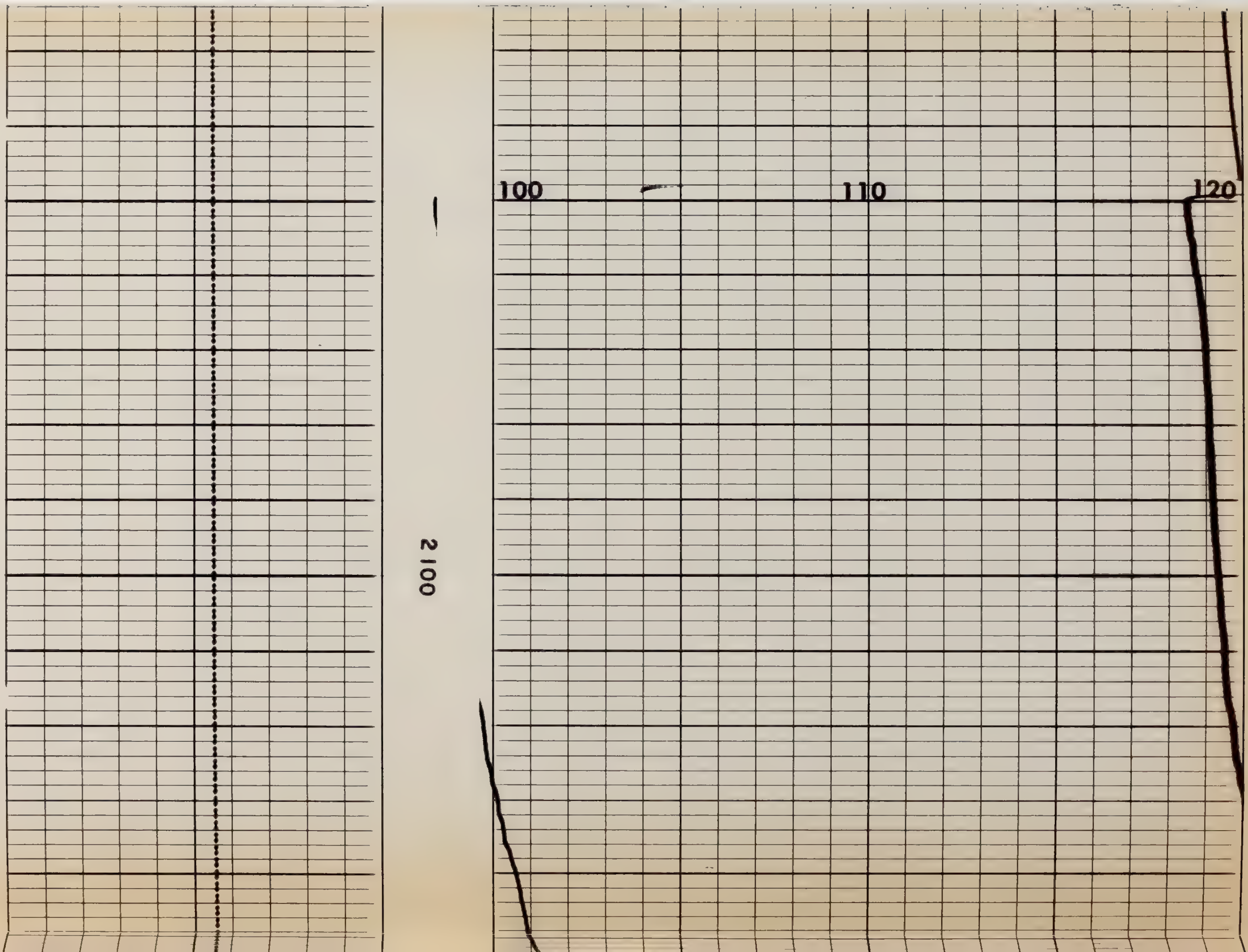
1600

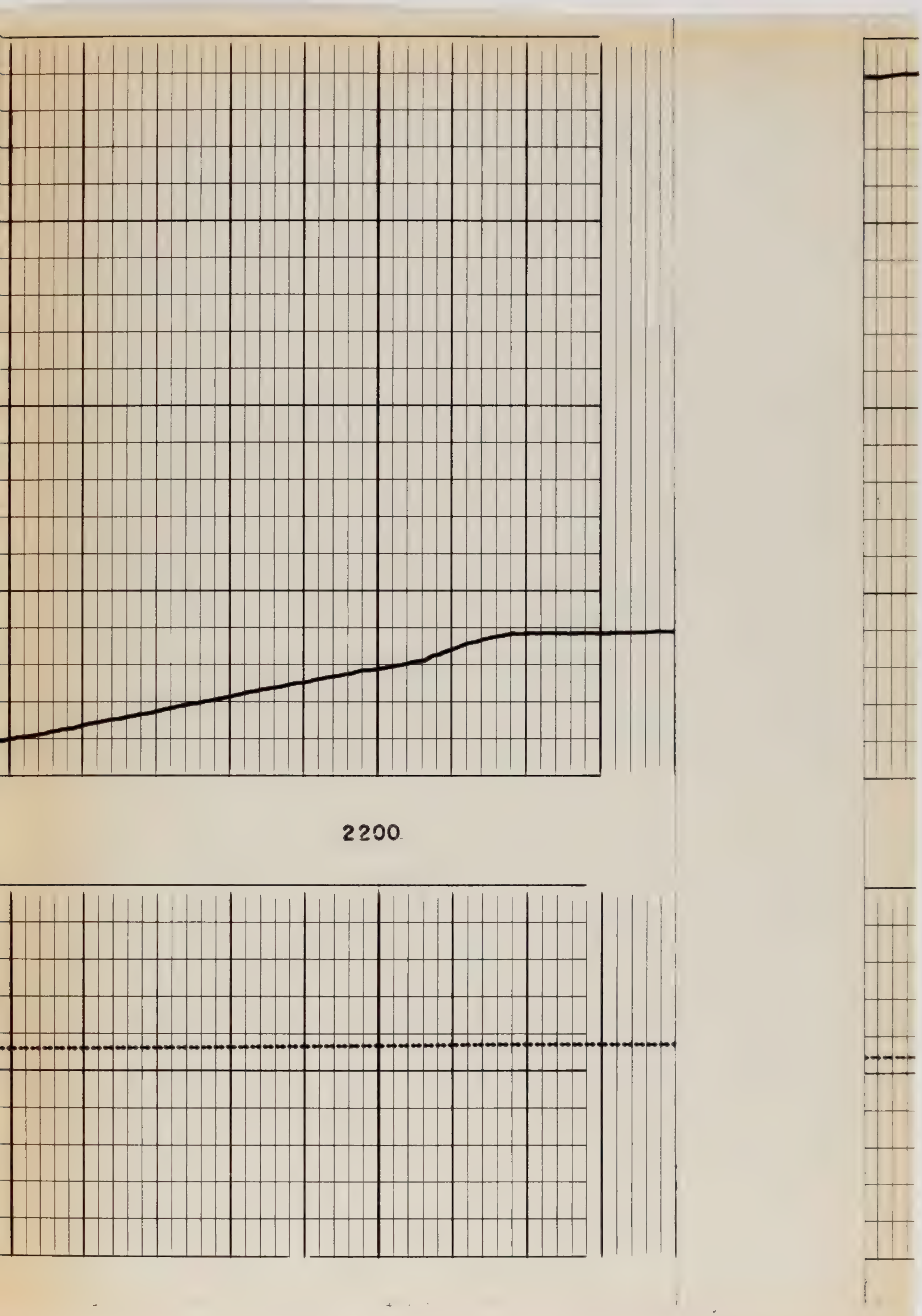


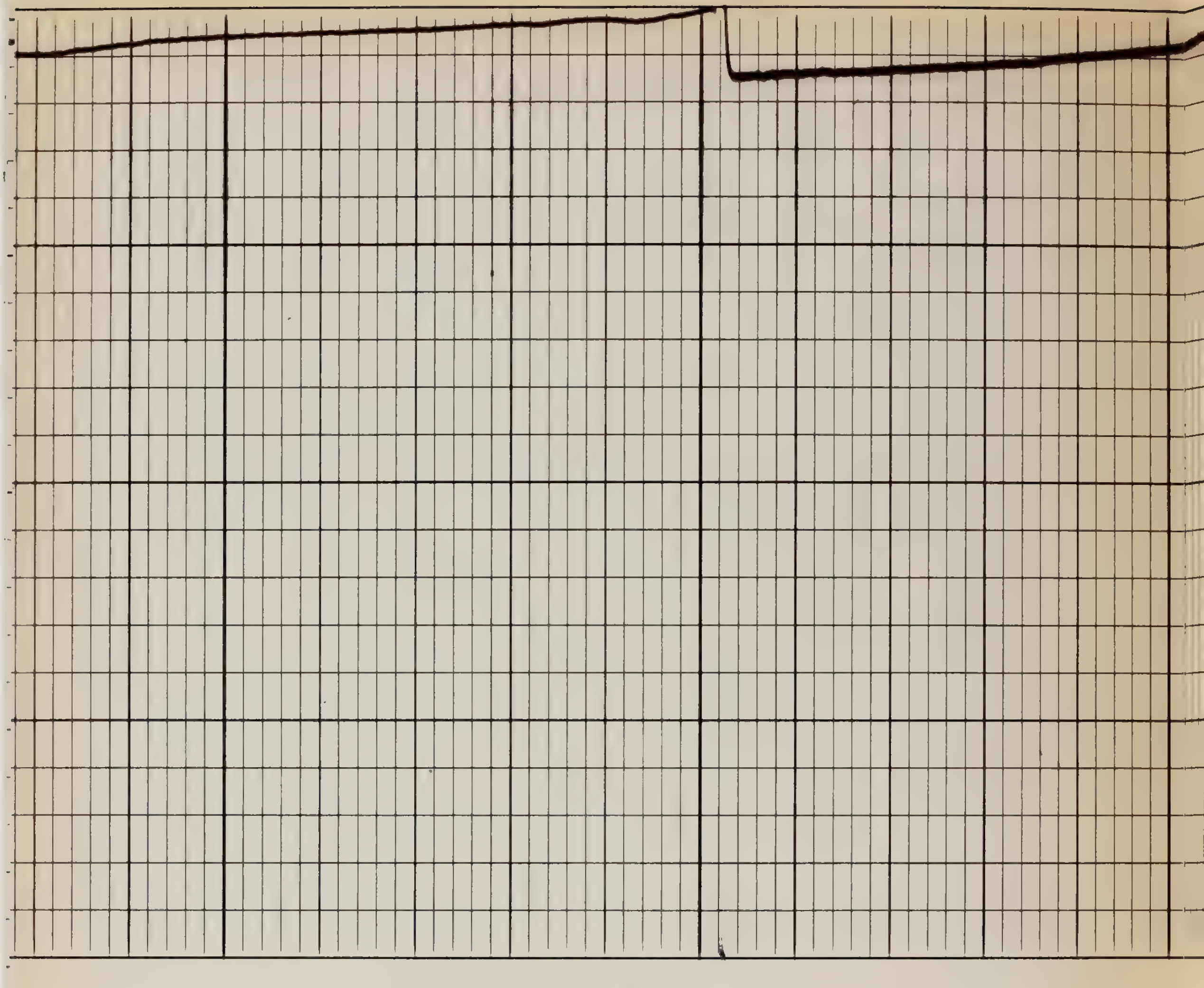

1700

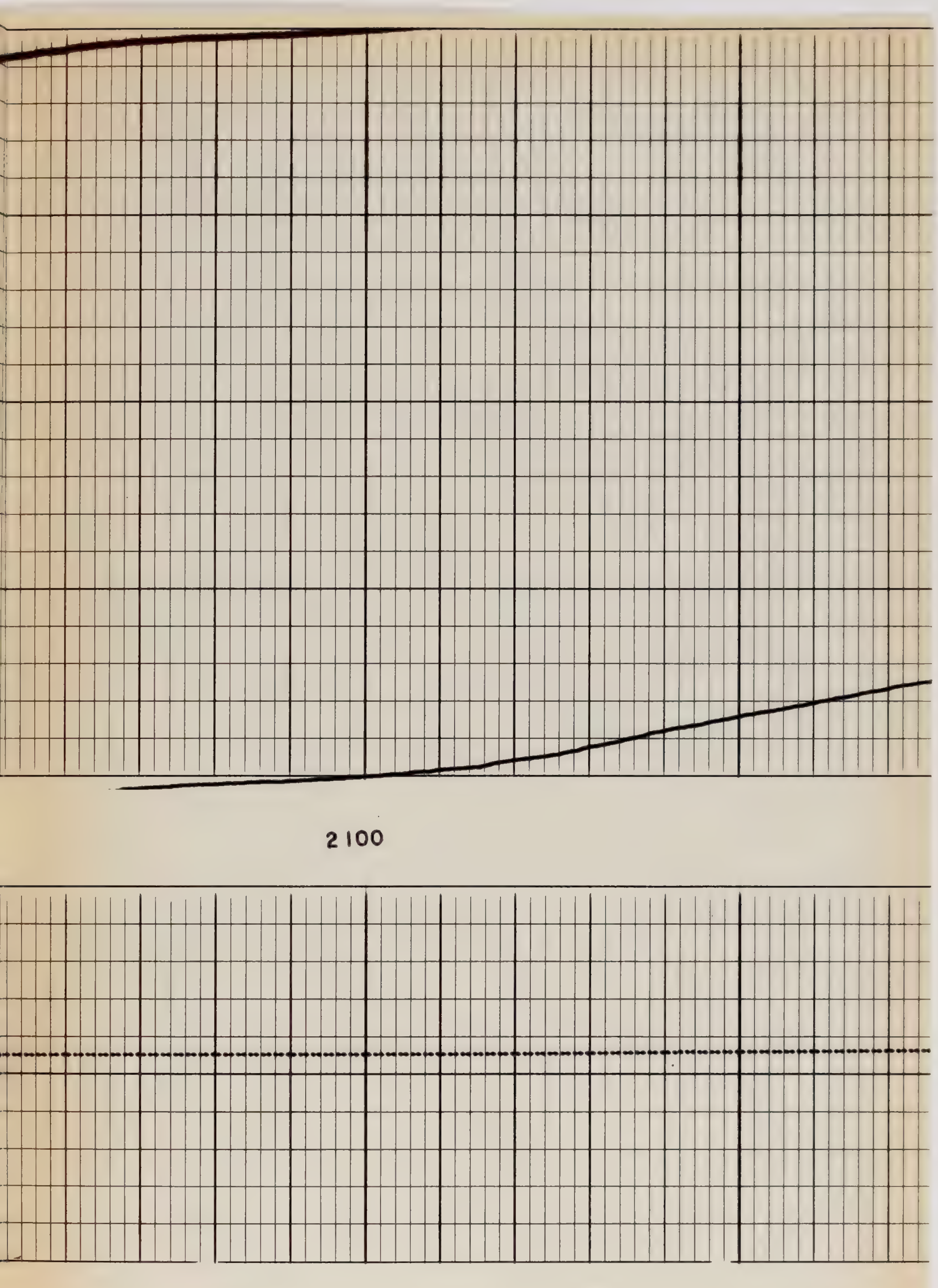

1800
1900


00
2000

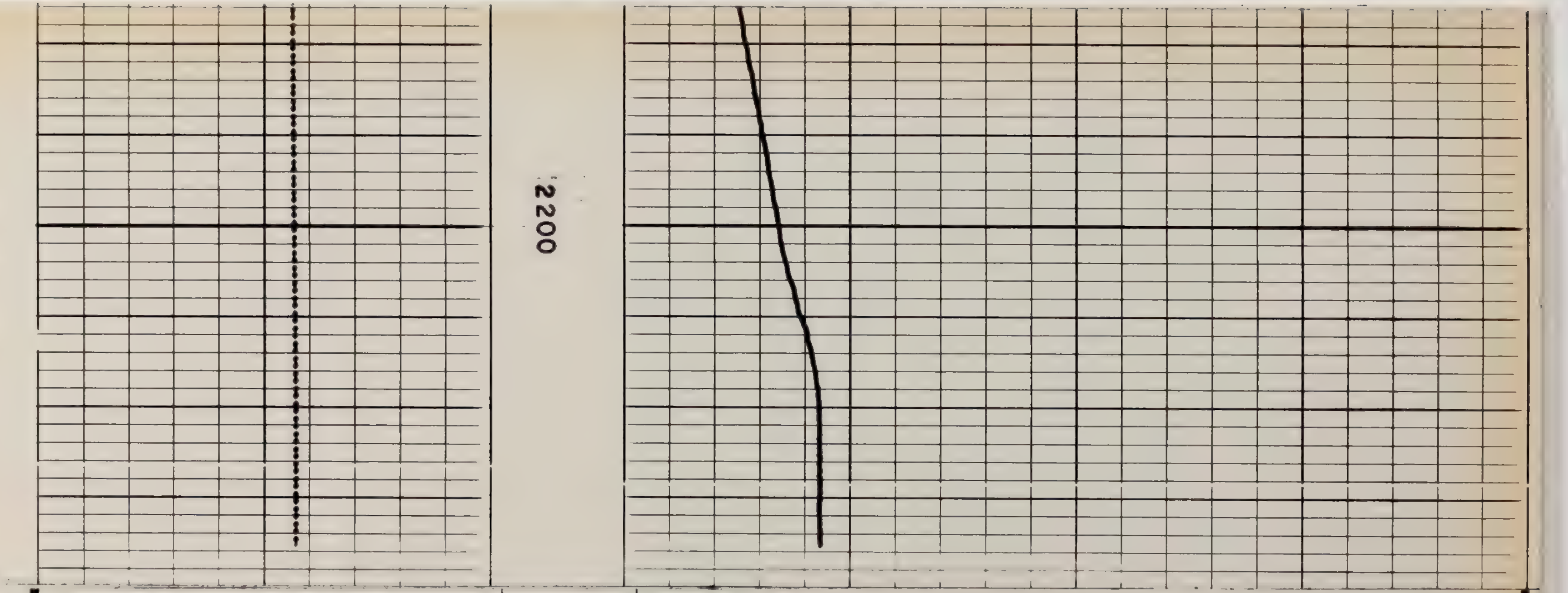

100
110
120
2100


2200


2000



2 100



TEMPERATURE °F.

COMPANY THE ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #6

FIELD SORGHUM GULCH

COUNTY RIO BLANCO

STATE COLORADO

SCHL. F. R. 2220

SCHL. T. D. 2220

DRLR. T. D. 2220

COUNTY RIO BLANCO, COLORAD

FIELD or LOCATION SORGHUM GULCH

Permanent
Log Measu
Drilling Me

Date
Run No.
Depth–Dri
Depth–Log
Btm. Log In
Top Log Int
Casing–Dri
Casing–Log
Bit Size
Type Fluid
Fluid Level
Dens.
pH Flu
Source of S
Rm @ Mea
Rmf @ Mea
Rmc @ Mea
Source: Rmf
Rm @ BHT
Time Since C
Max. Rec. Te
Equip. Loca
Recorded By
Witnessed By

Schlumberger

BOREHOLE COMPENSATED SONIC LOG - GAMMA RAY

(WITH CALIPER)

COUNTY RIO BLANCO, COLORAD
FIELD or LOCATION SORGHUM GULCH
WELL SORGHUM GULCH #6
COMPANY ATLANTIC RICHFIELD

COMPANY THE ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #6

FIELD SORGHUM GULCH

COUNTY RIO BLANCO, COLORADO

Location:
2523 FSL & 2251 FWL
Sec. 7 Twp. 3S Rge. 96W

Other Services:
DIL
FDC--CNL-GR
HRT

Permanent Datum: GL ; Elev.: 6888
Log Measured From GL 0 Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B.
D.F.
G.L. 6888

Date	8/23/74			
Run No.	ONE			
Depth—Driller	2220			
Depth—Logger	2220			
Btm. Log Interval	2219			
Top Log Interval	466			
Casing—Driller	8-5/8@ 59	@	@	@
Casing—Logger				
Bit Size	6-1/4			
Type Fluid in Hole	WATER			
Fluid Level	466			
Dens. | Visc.				
pH | Fluid Los	ml	ml	ml	ml
Source of Sample				
Rm @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
Rmf @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
Rmc @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
Source: Rmf | Rmc				
Rm @ BHT	@ °F	@ °F	@ °F	@ °F
Time Since Circ.	14 HOURS			
Max. Rec. Temp.	104 °F	°F	°F	°F
Equip. | Location	5602 | GJ			
Recorded By	BARGHOUTI			
Witnessed By	ELLARD, TAIT			

The well name, location and borehole reference data were furnished by the

FOLD HERE The well name, location and borehole reference data were furnished by the customer.

CHANGES IN MUD TYPE OR ADDITIONAL SAMPLES

Date / Sample No.				
Depth - Driller				
Type Fluid in Hole				
Dens. / Visc.				
ph / Fluid Loss		ml		ml
Source of Sample				
R_m @ Meas. Temp.	@	°F	@	°F
R_{mf} @ Meas. Temp.	@	°F	@	°F
R_{mc} @ Meas. Temp.	@	°F	@	°F
Source: R_{mf} / R_{mc}				
R_m @ BHT	@	°F	@	°F
R_{mf} @ BHT	@	°F	@	°F
R_{mc} @ BHT	@	°F	@	°F

SCALE CHANGES

Type Log	Depth	Scale Up Hole	Scale Down Hole

EQUIPMENT DATA

Run No.	ONE
Sonic Panel No.	JD-439
Sonic Cart No.	A-166
Sonic Sonde No.	D-499
Mem. Panel No.	B-238
G.R. Cart. No.	G-289
G.R. Panel No.	EA-169
Caliper No	D-851
TTR No.	
Cent. Device	SPRING
Stand off - Inches	VARIABLE
Time Const. - Sec.	2
Speed - F.P.M.	30

REMARKS

Service Order No. - 15133

API Serial No. -

CALIBRATION DATA

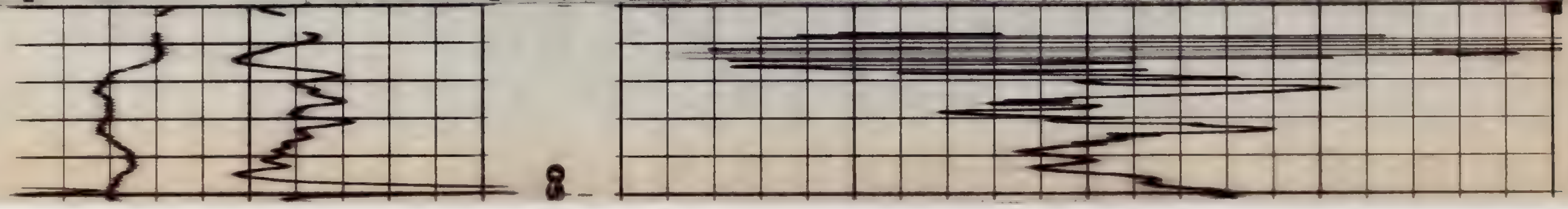
CALIBRATION	BACKGND. CPS.	SOURCE CPS.	GALV. INCR. DIVISION	SENS. TAP (FOR CAL.)	SENS. TAP (RECORD)	TIME CONST.
GAMMA RAY:	140	580	100	150	150	1

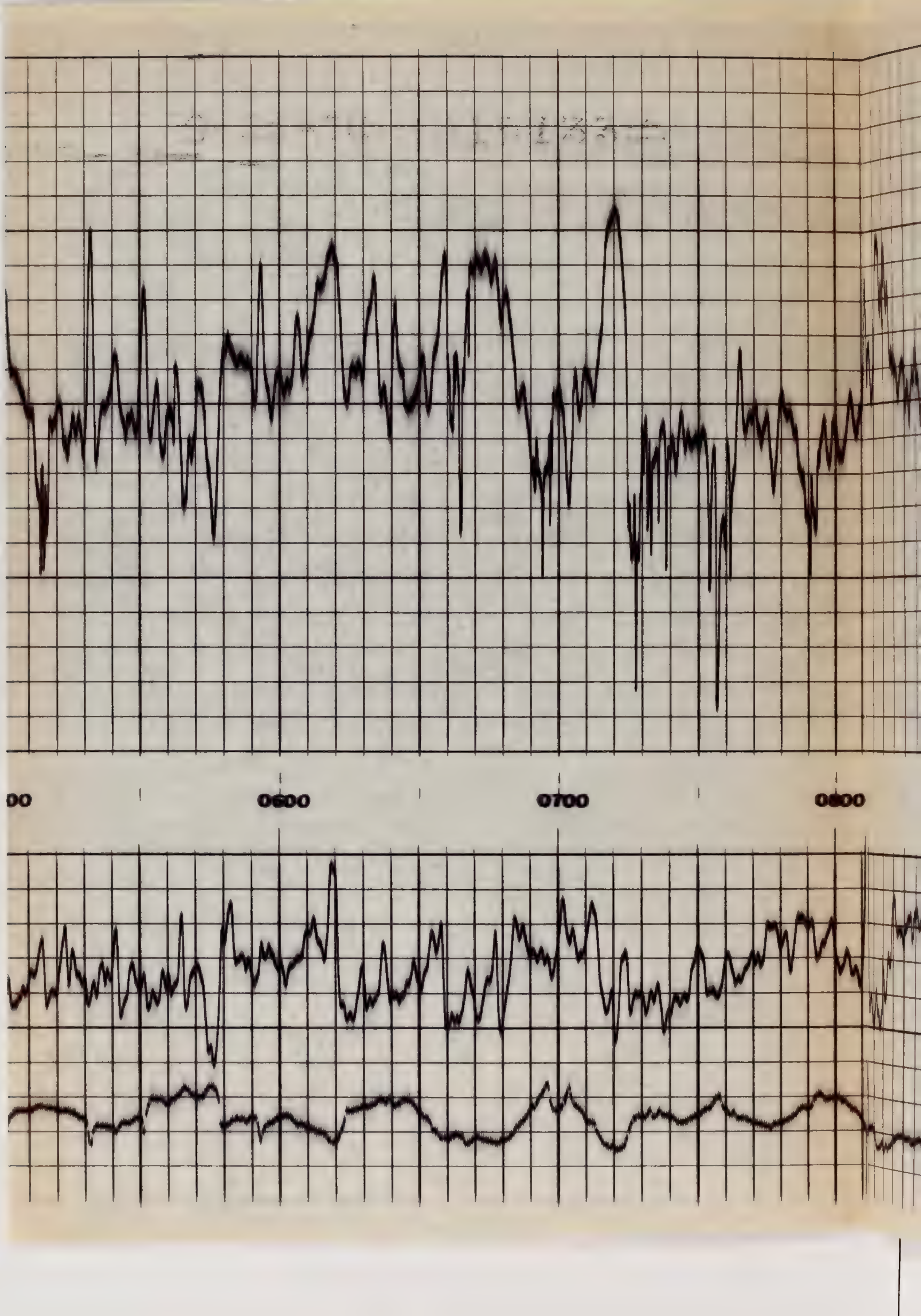
All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not guarantee the accuracy

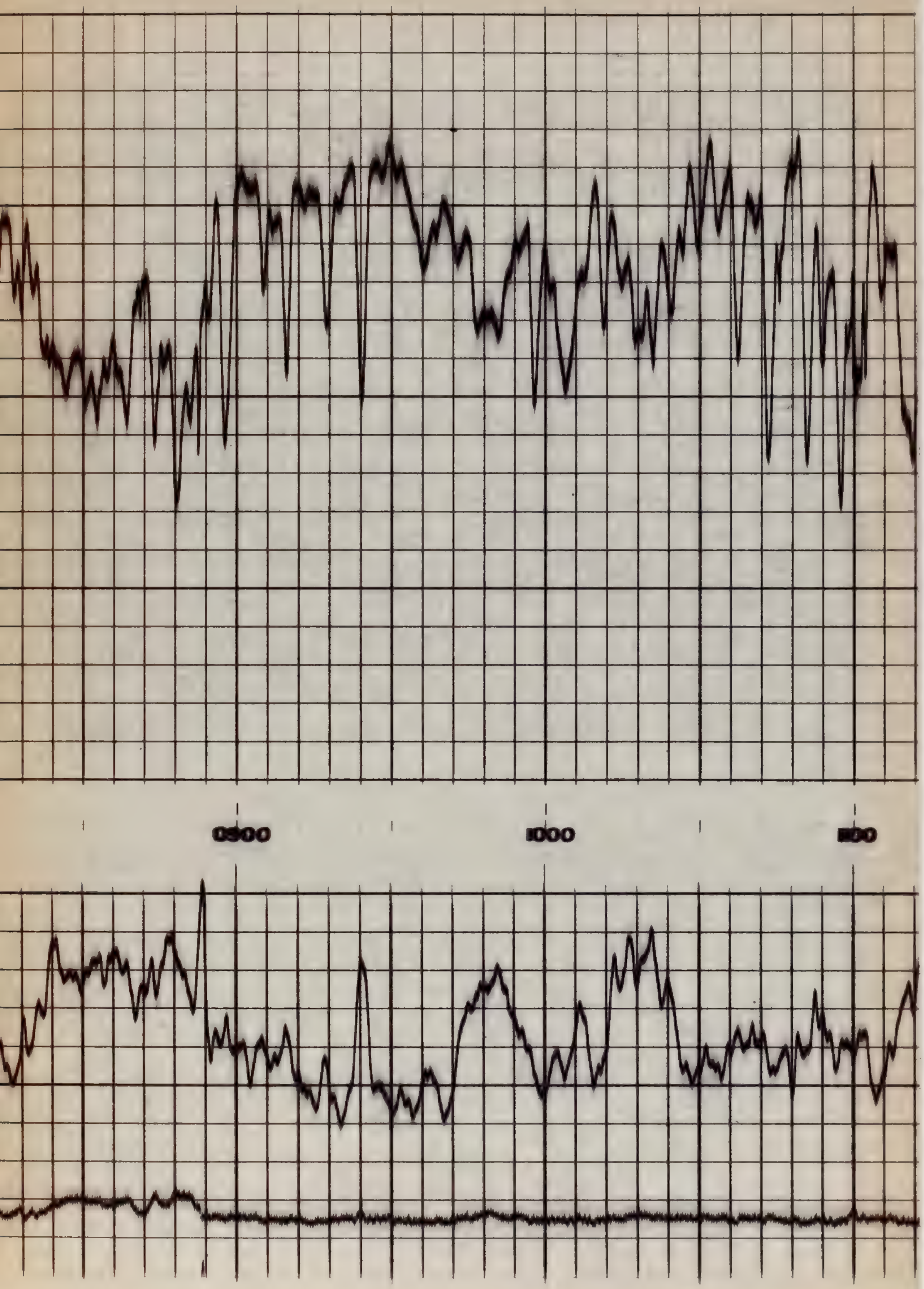
	CPS.	CPS.	DIVISION	(FOR CAL.)	(RECORD)	CONST.	
GAMMA RAY:	140	580	100	150	150	1	

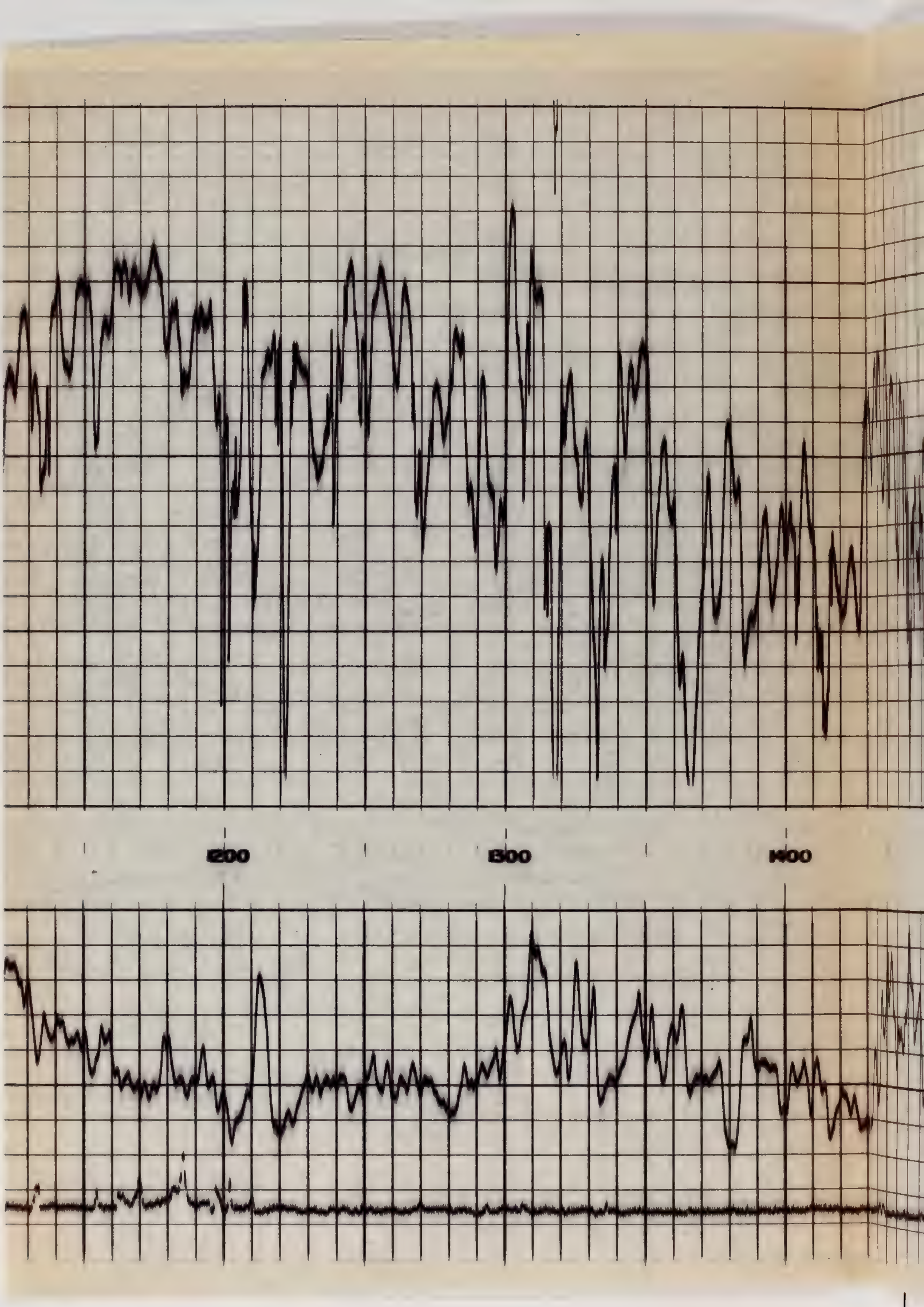
All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to Clause 7 of our General Terms and Conditions as set out in our current Price Schedule.

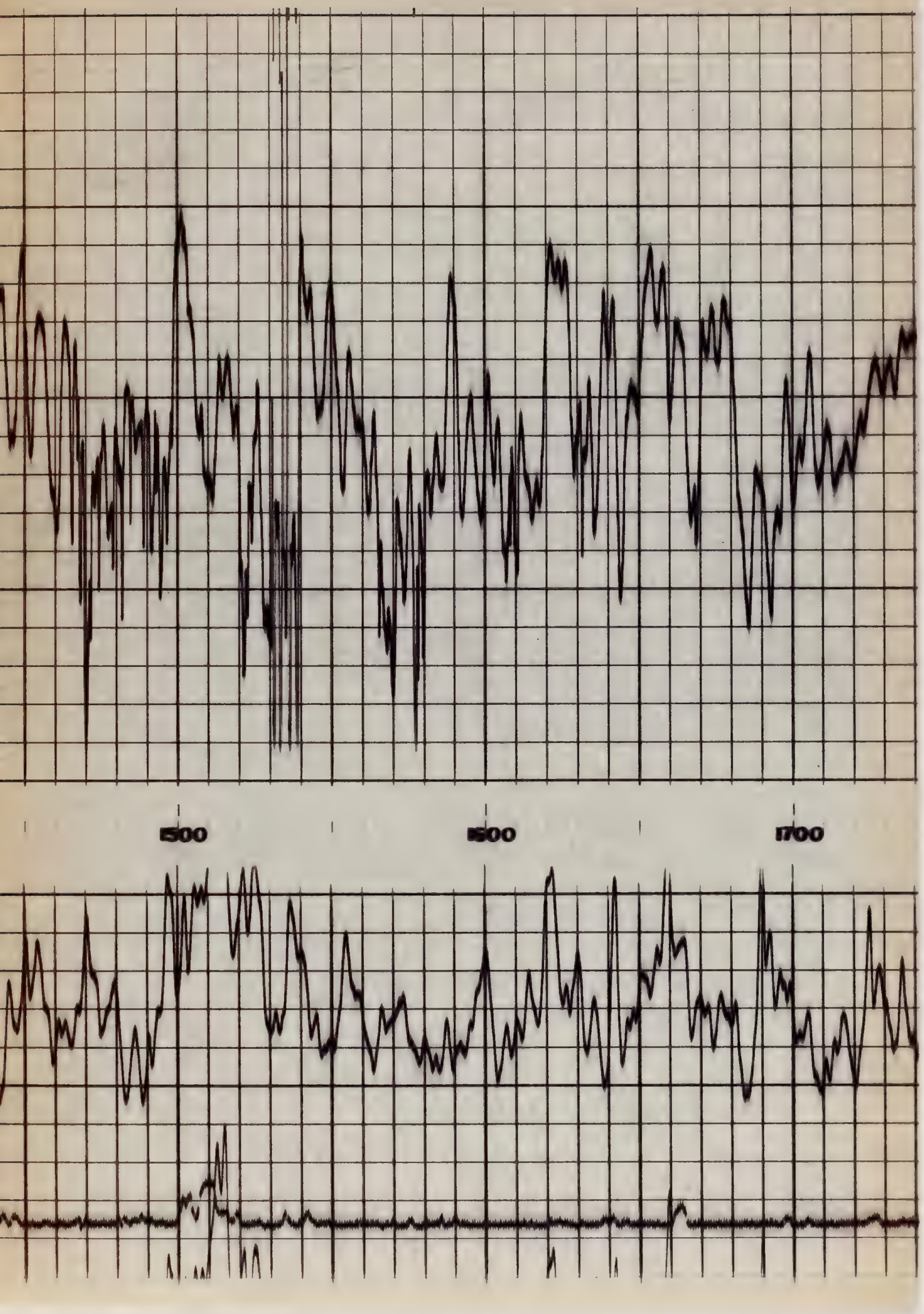
GAMMA RAY API UNITS	DEPTHS	INTERVAL TRANSIT TIME MICROSECONDS PER FOOT
		T 3 R₁ 2 R₂
0 — 150		150 — 100 — 50
150 — 300		250 — 200 — 150
CALIPER HOLE DIAM. IN INCHES		
5 — 15		

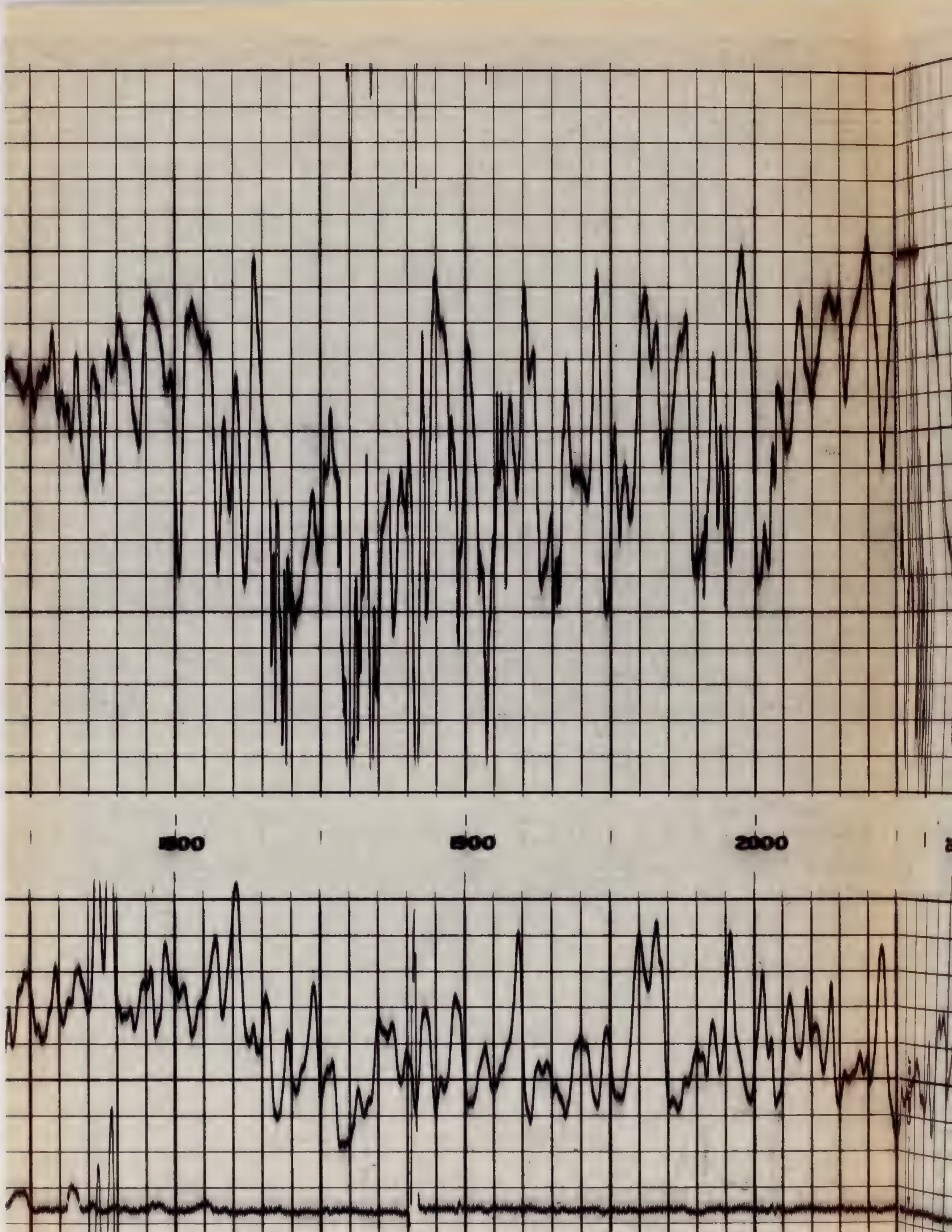


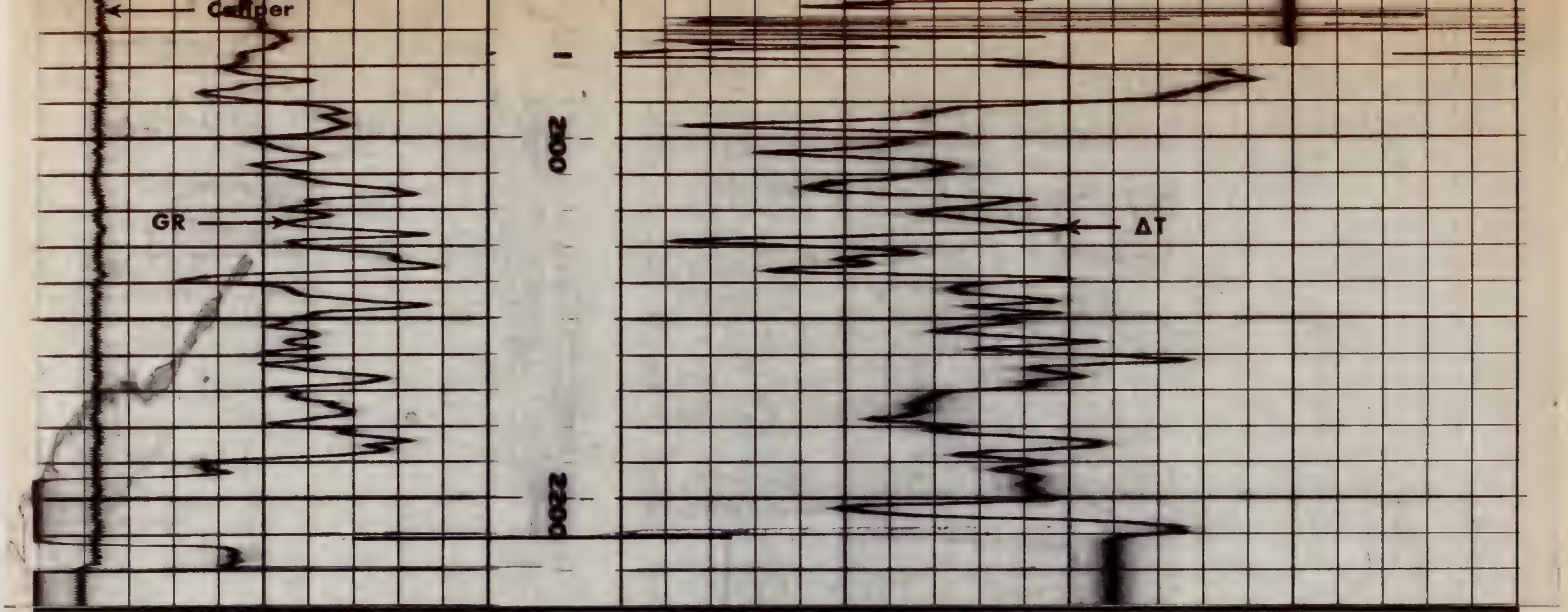

00
0600
0700
0800


0900
1000
1100


1200
1300
1400


1500
1600
1700

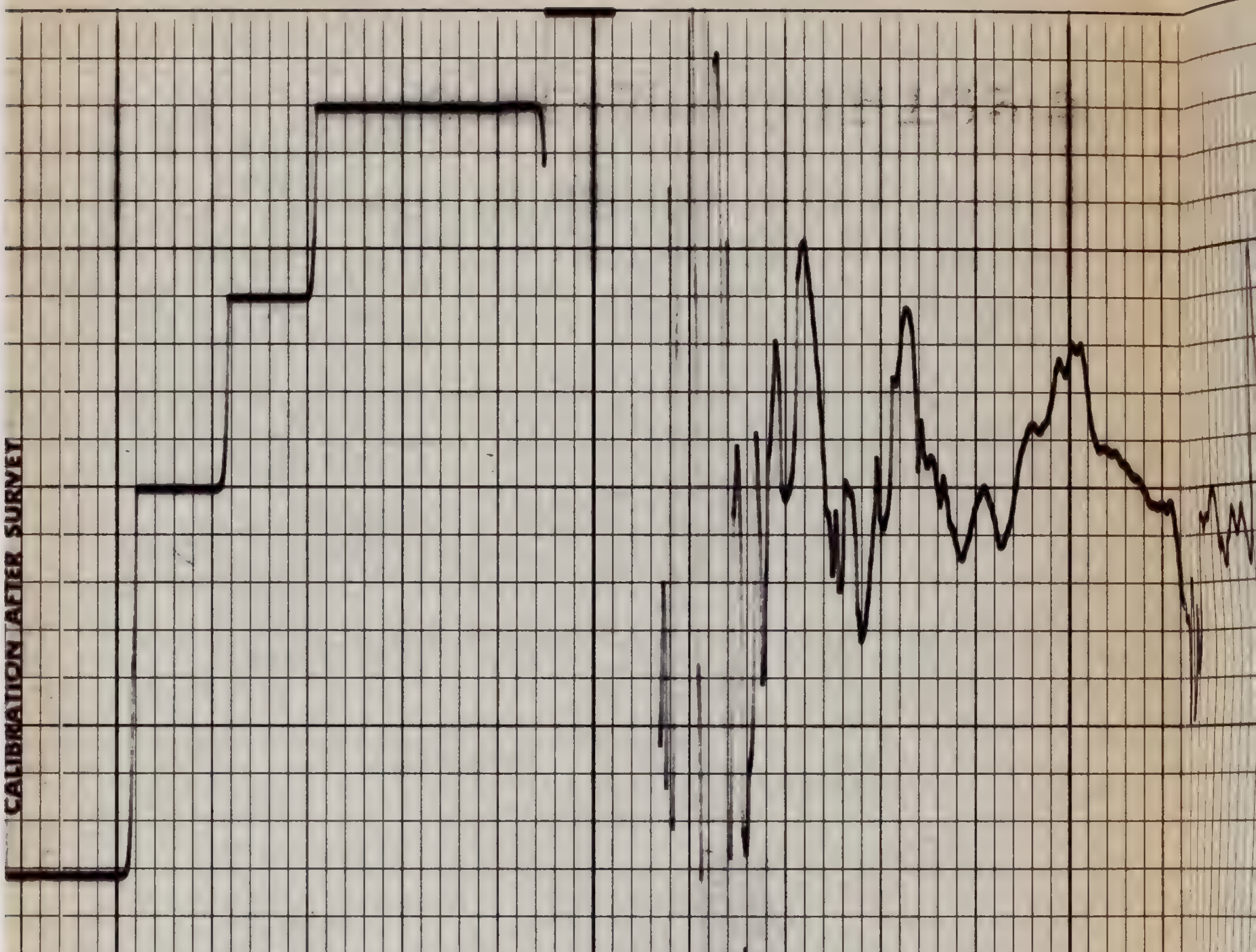

1000
1500
2000

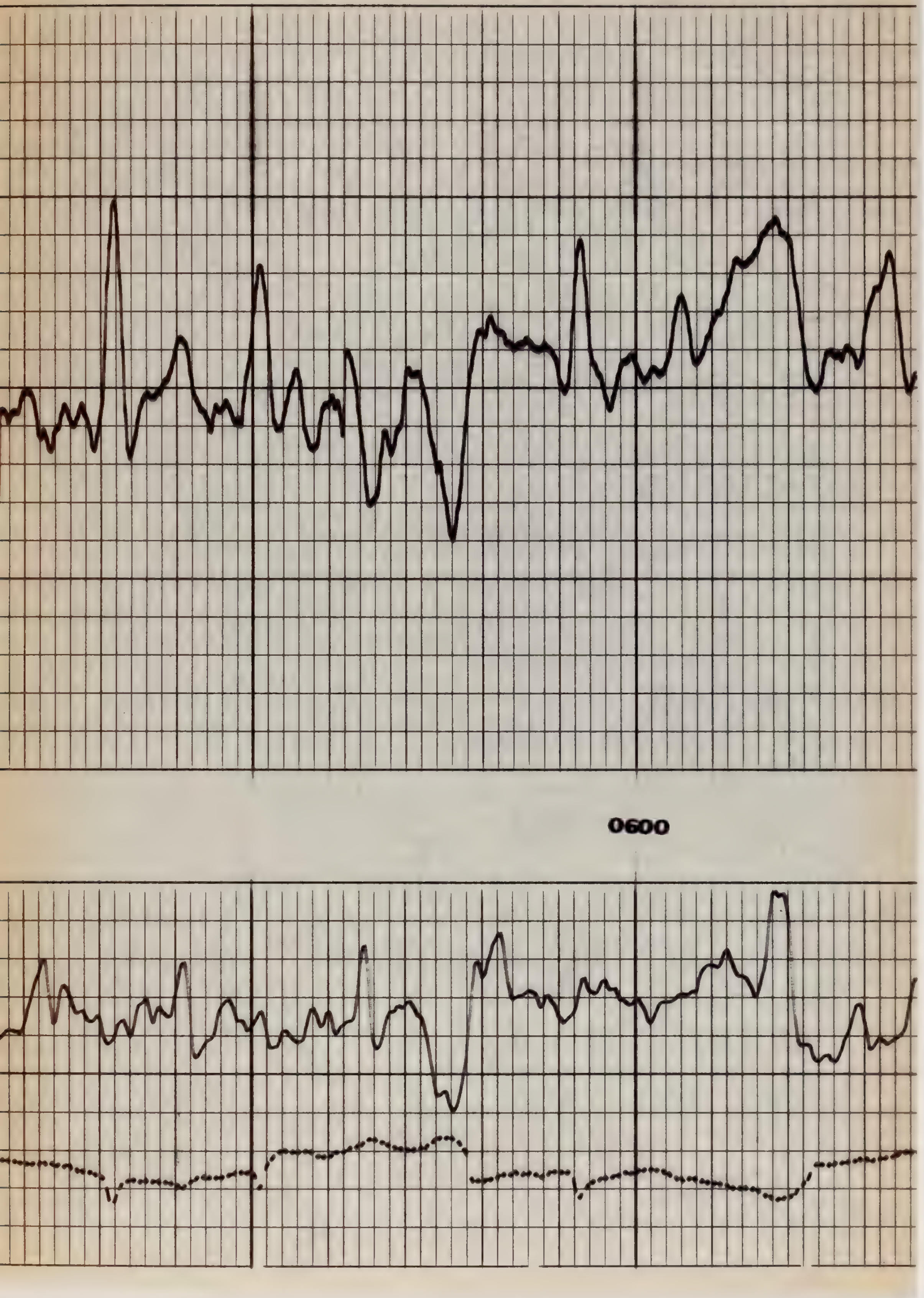


DETAIL LOG

5″ = 100′

CALIPER DIAM. IN INCHES 5 — 15	DEPTH	**INTERVAL TRANSIT TIME** MICROSECONDS PER FOOT T 3 R₁ 2 R₂ 150 — 100 — 50 250 — 200 — 150
GAMMA RAY API UNITS 0 — 150 150 — 300		


CALIBRATION AFTER SURVEY
0400
FLUID LEVEL
0500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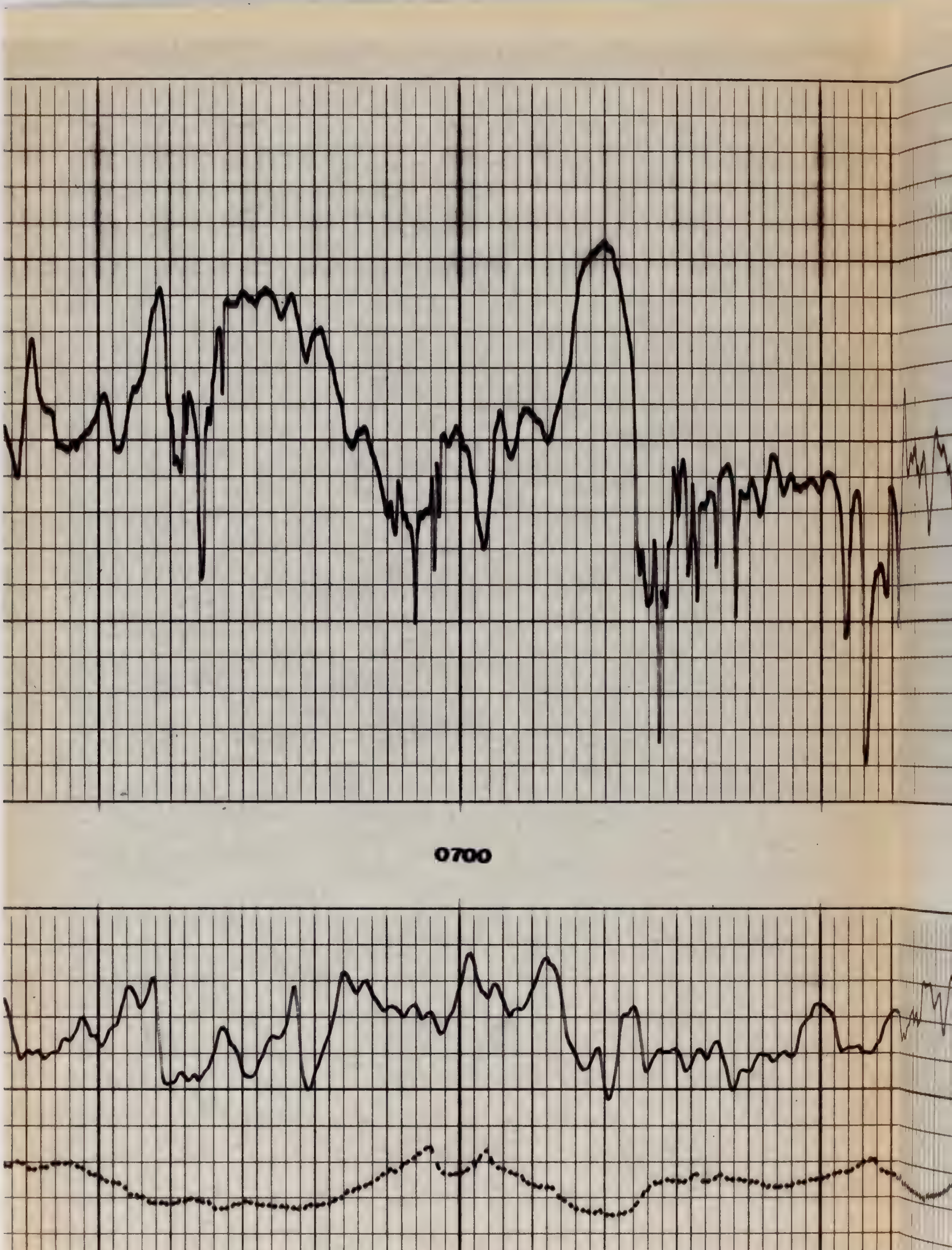
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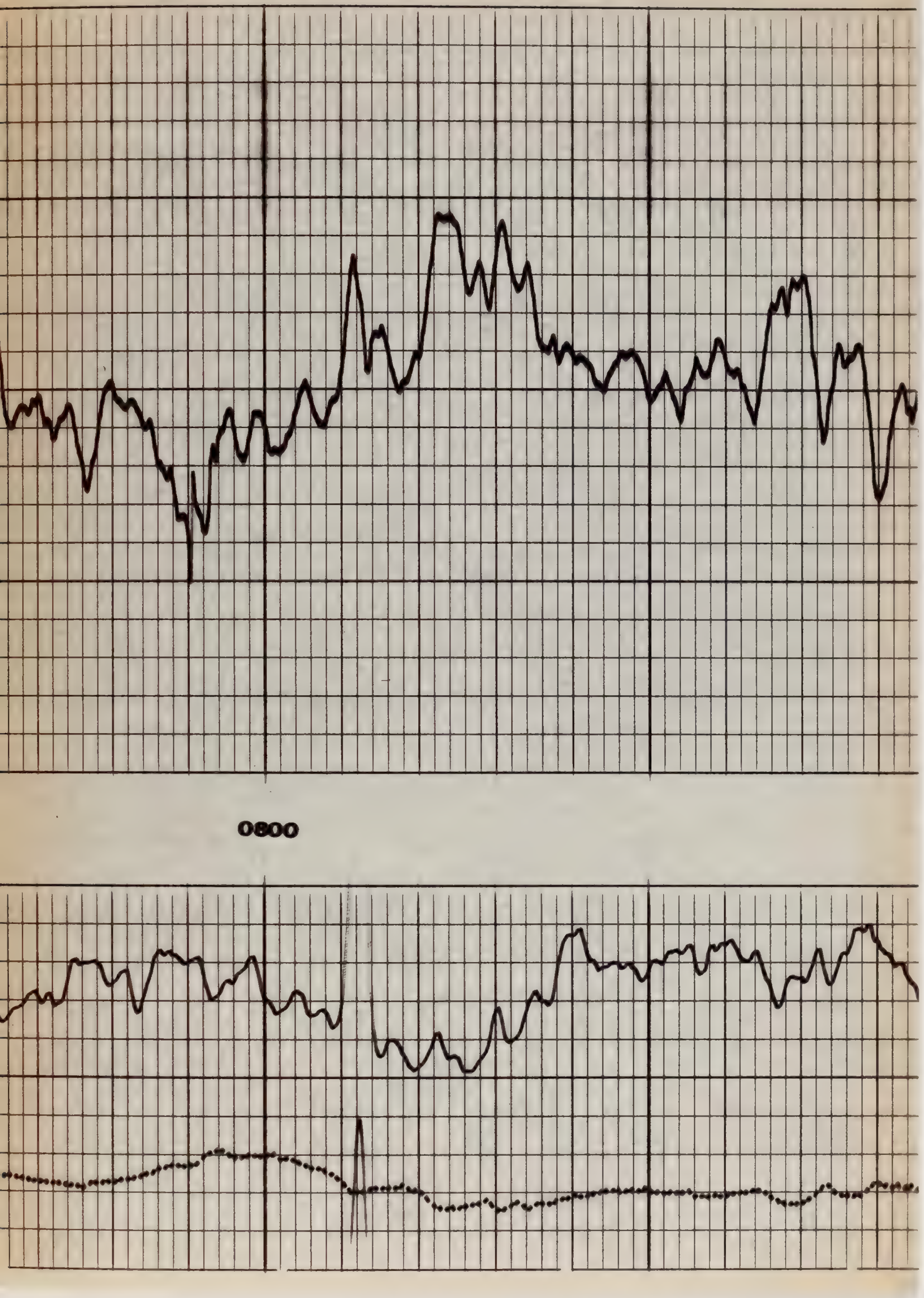
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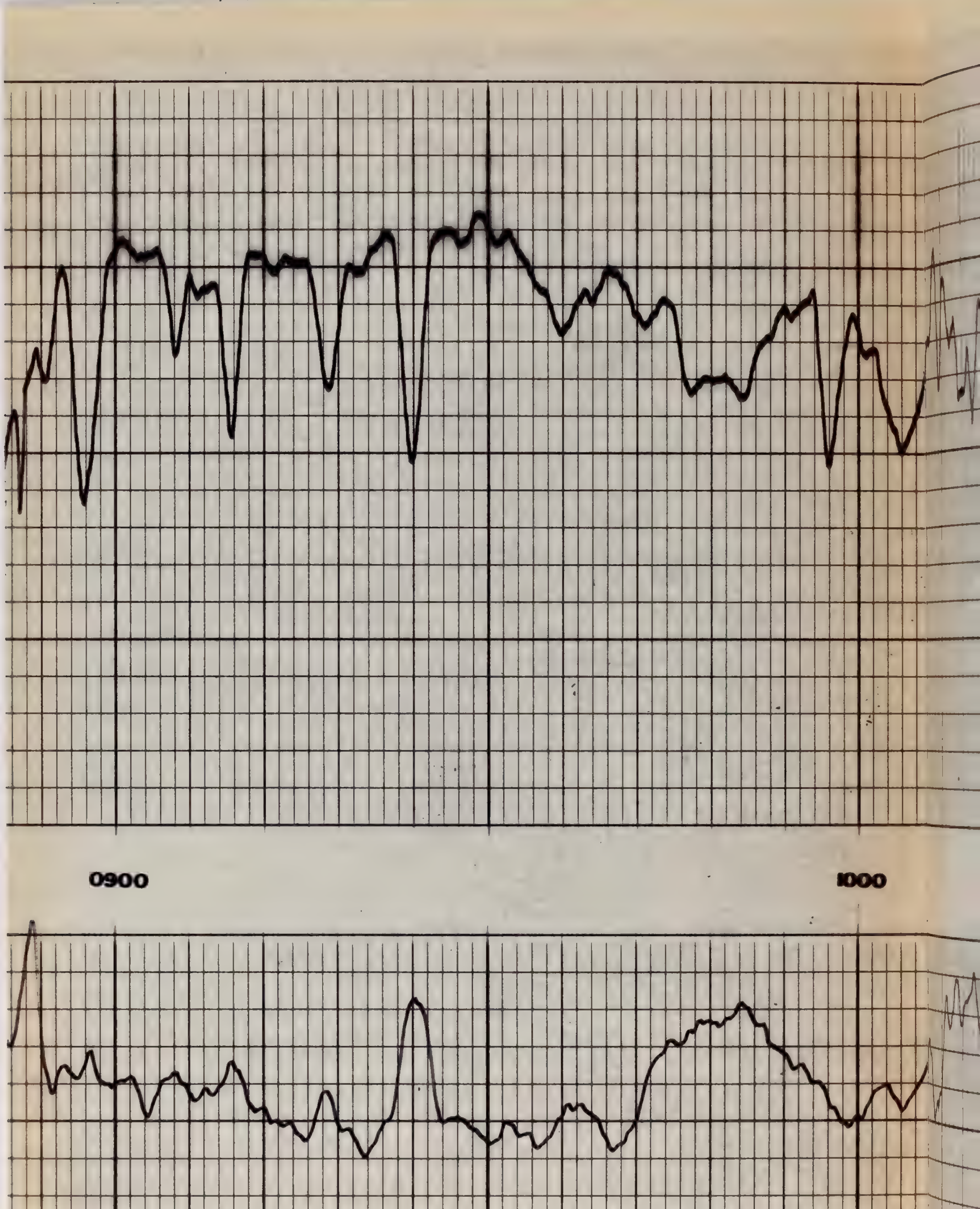
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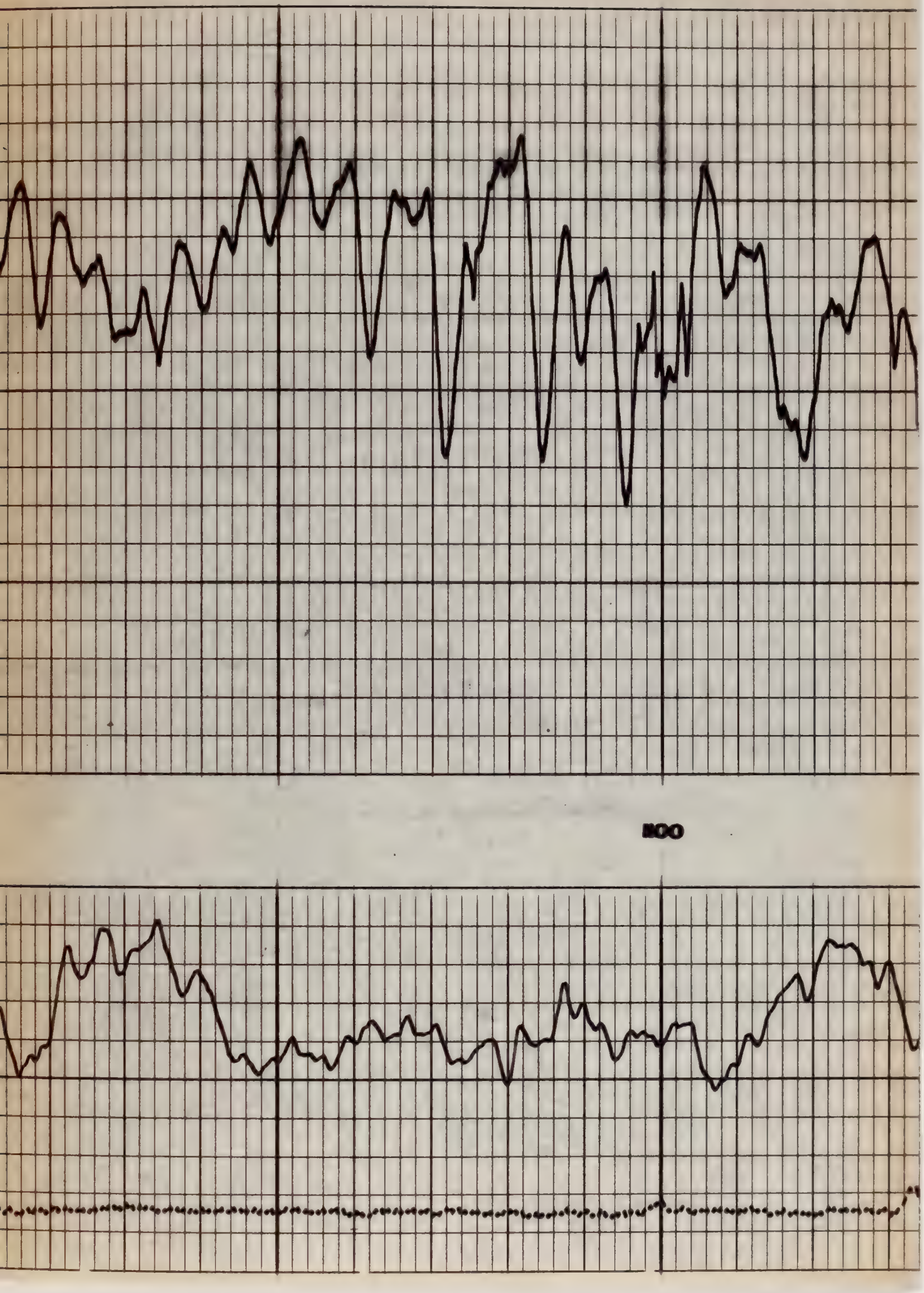
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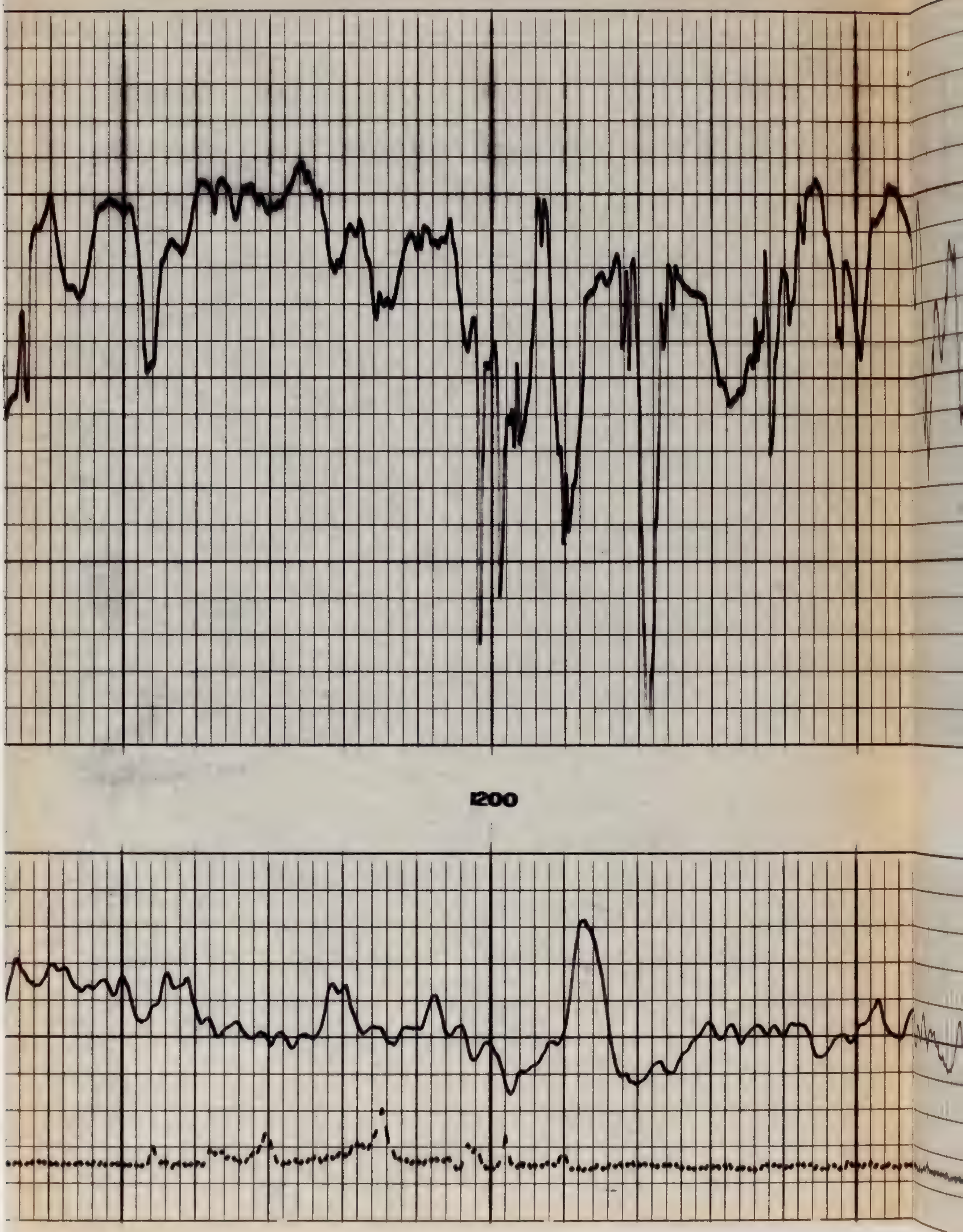
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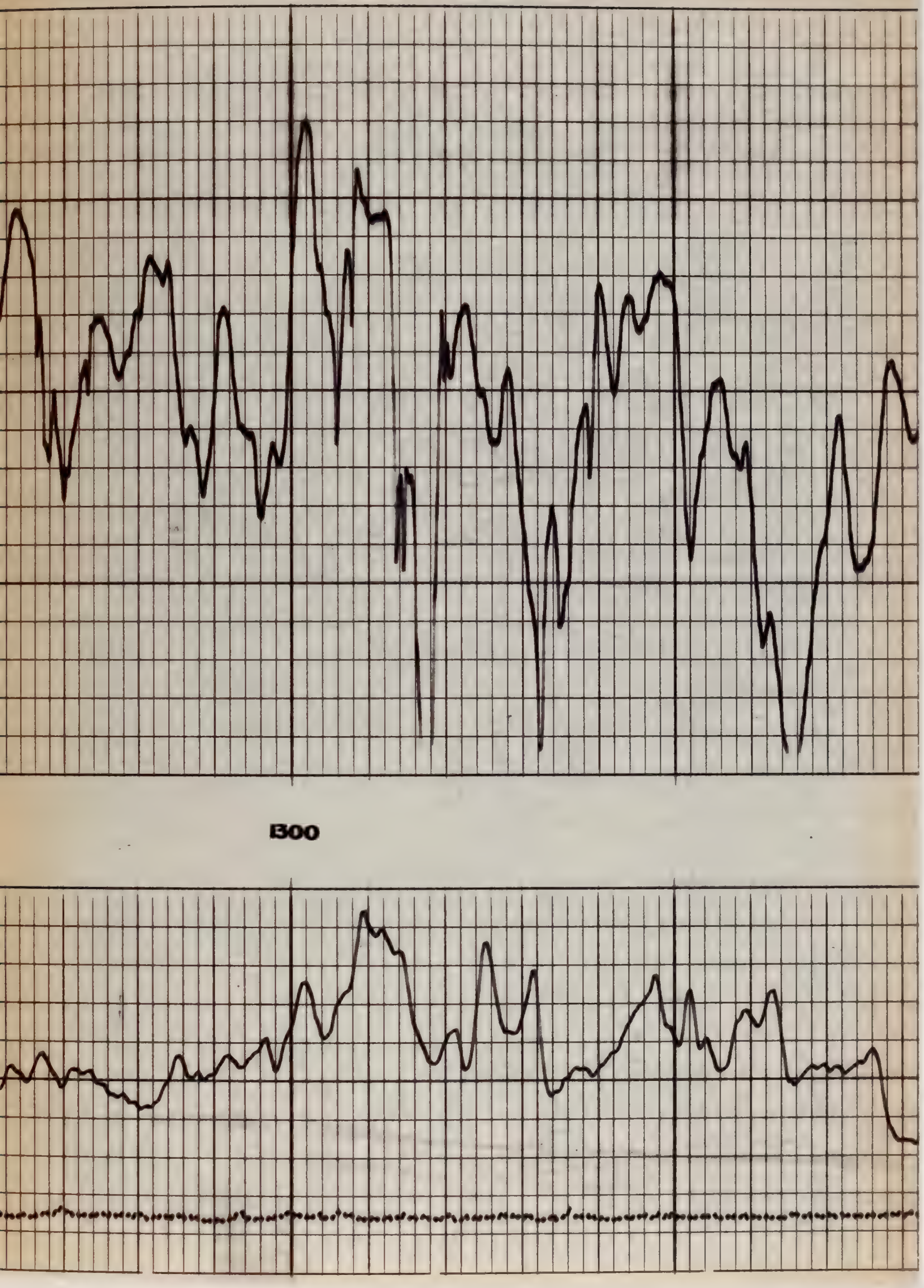
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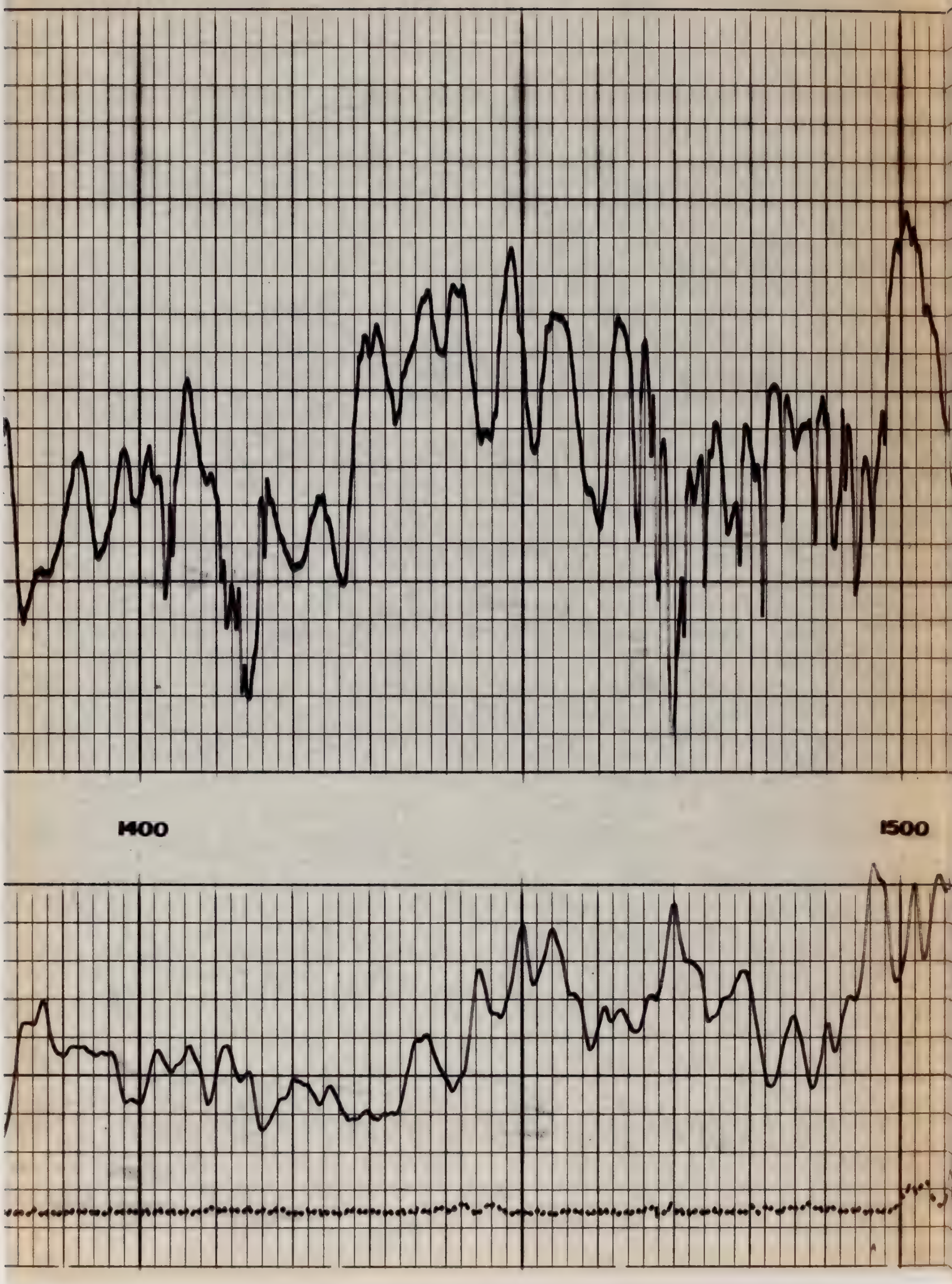
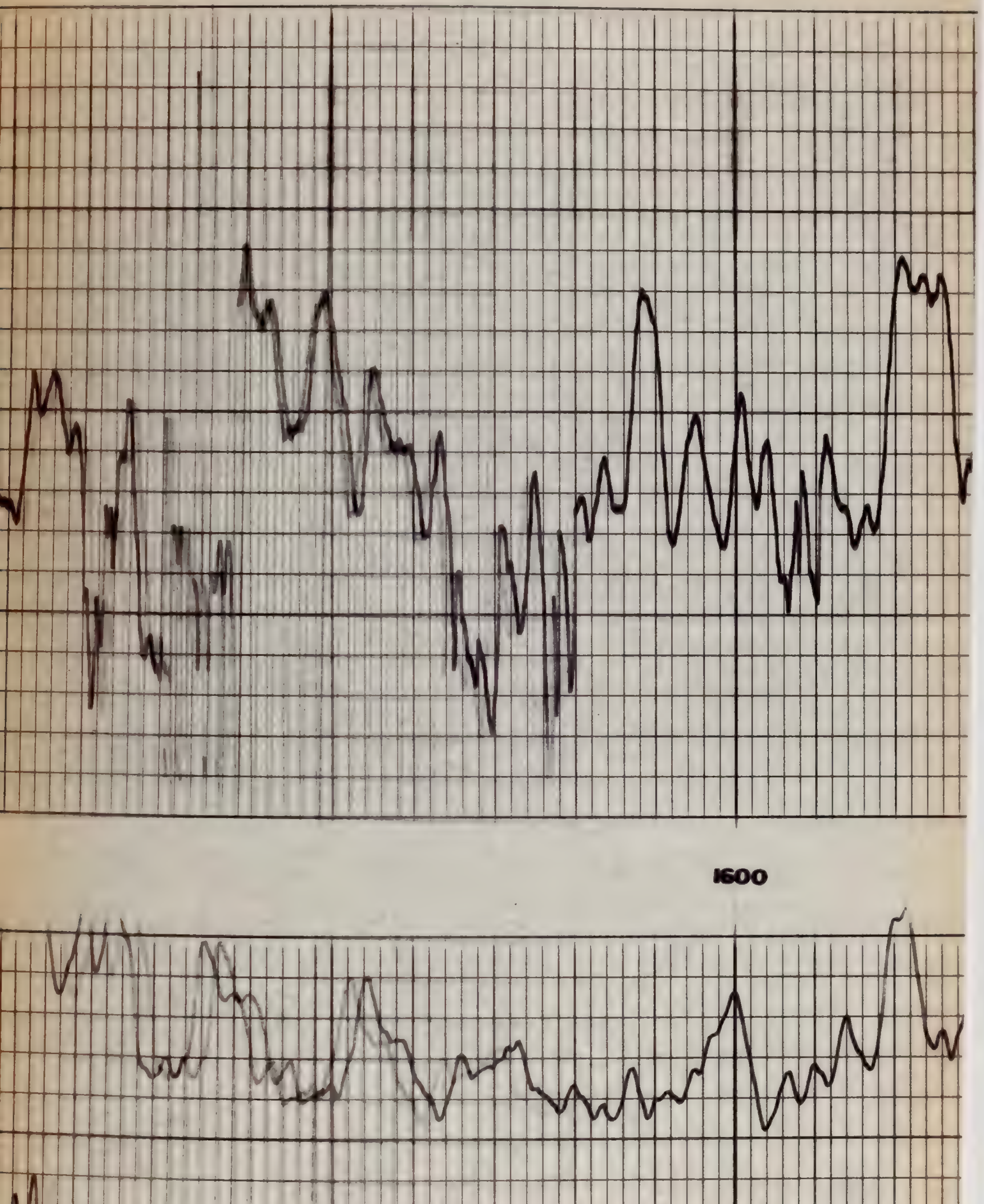


1400
1500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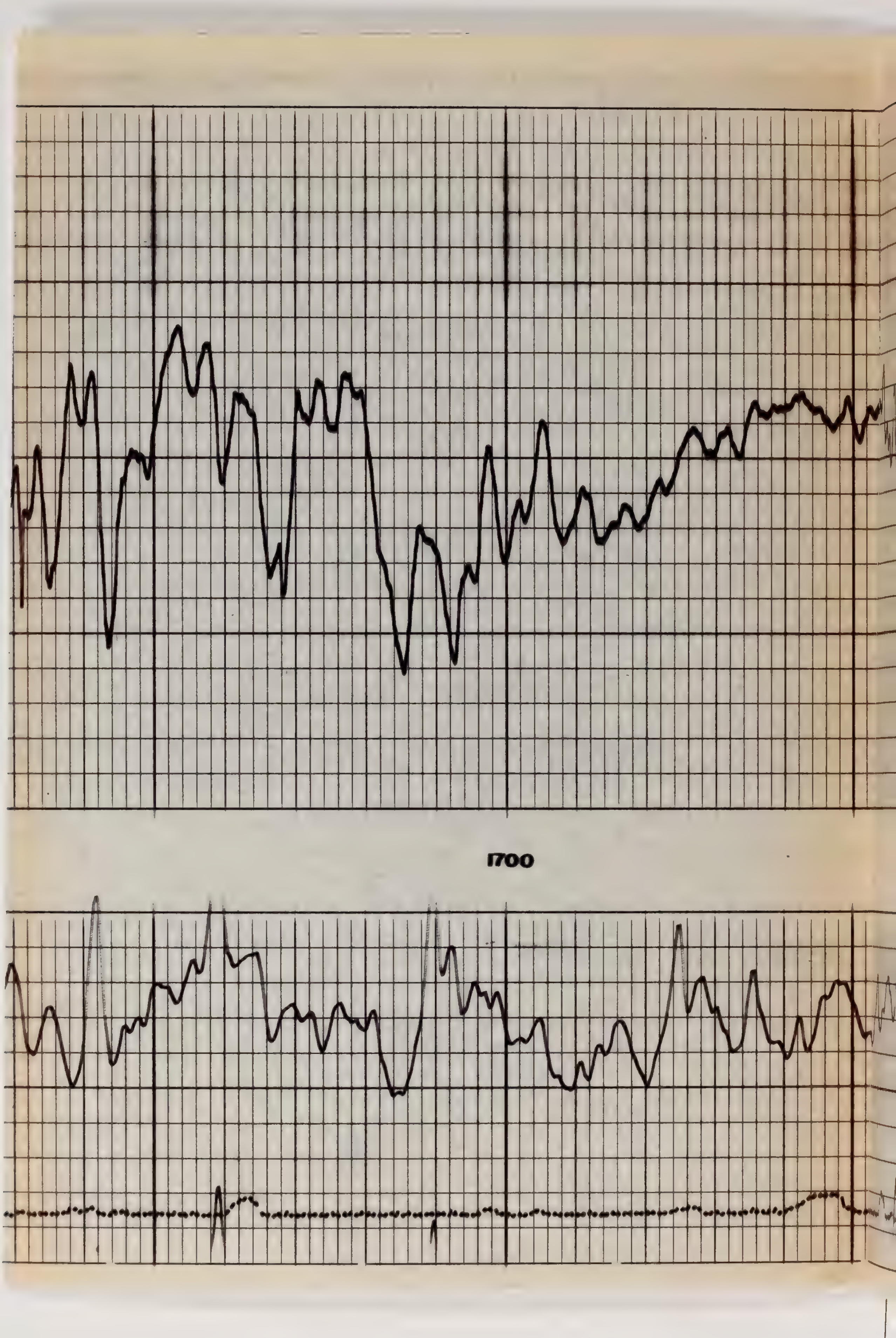
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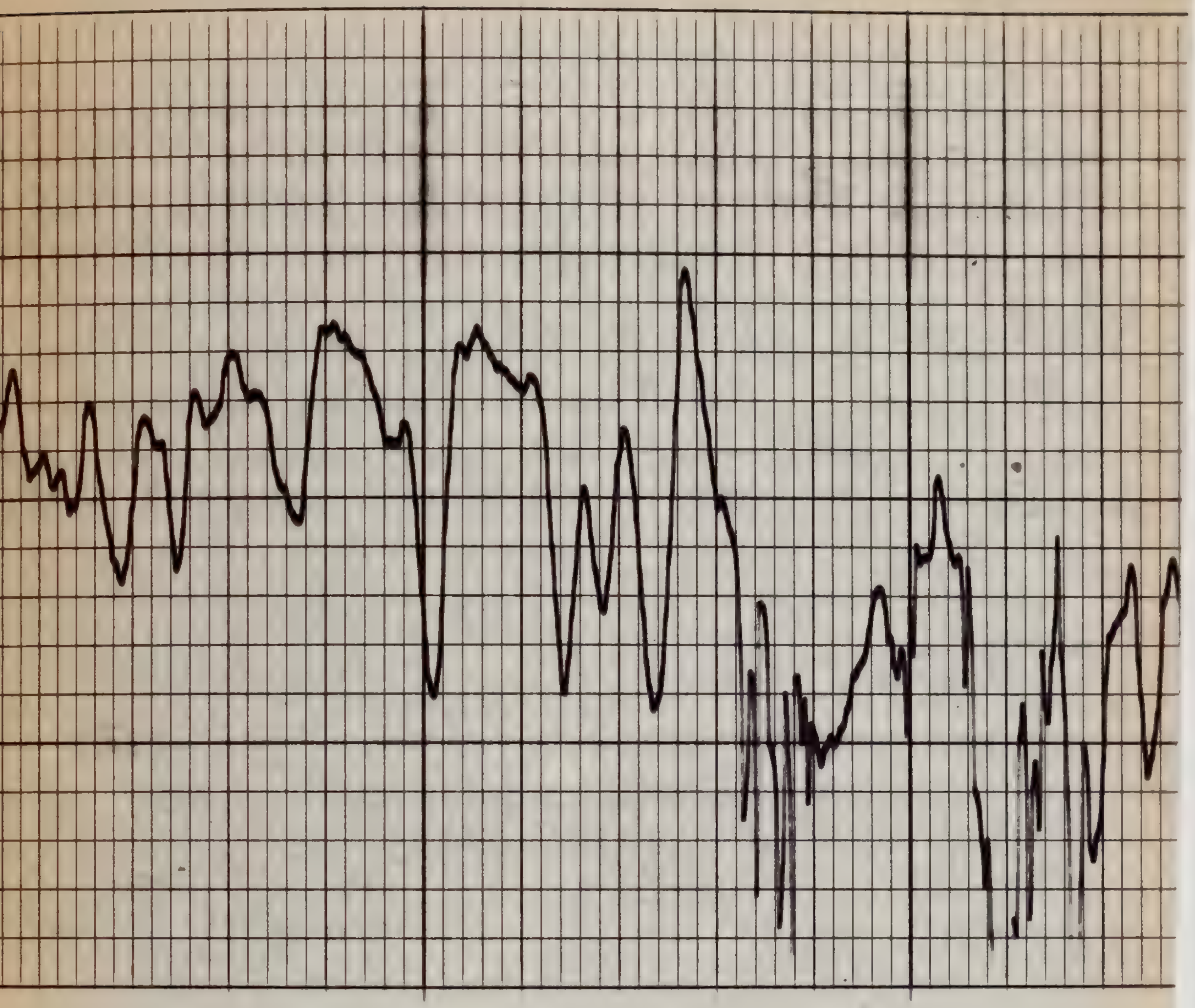

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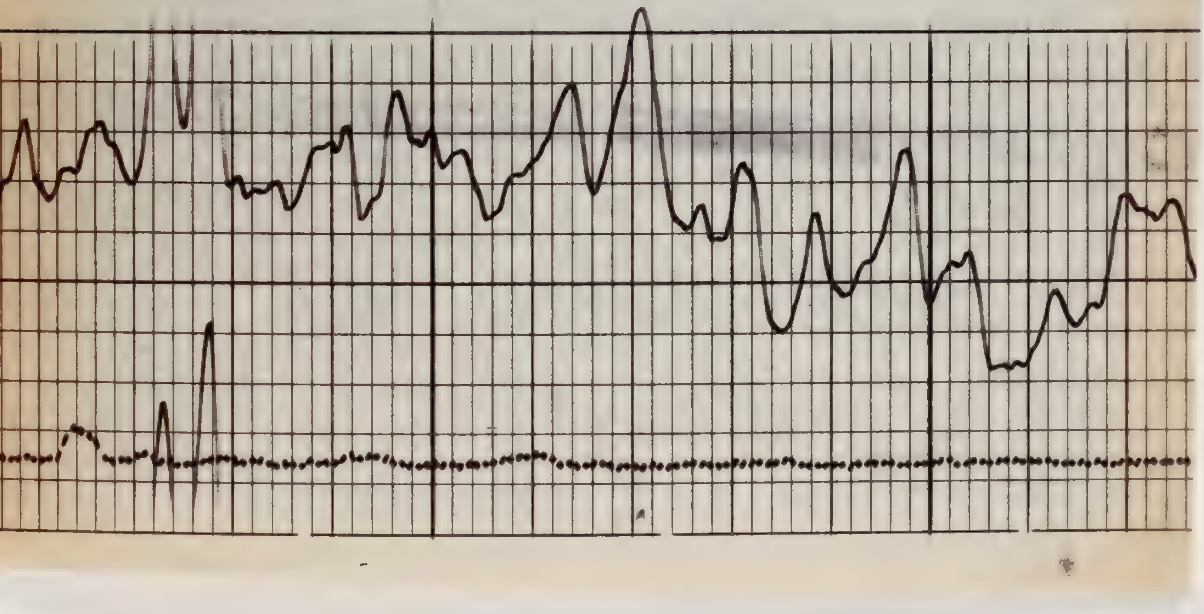
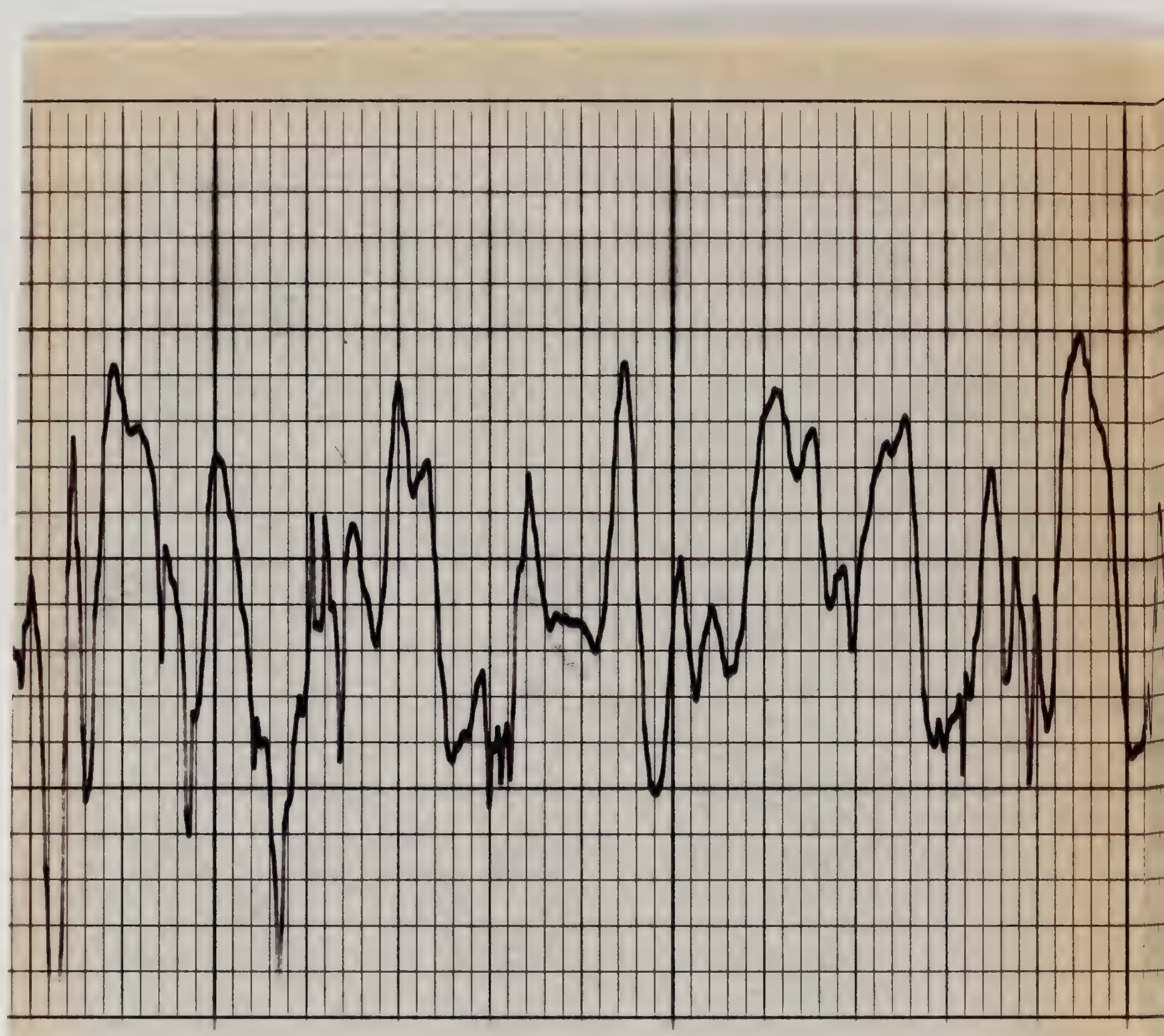
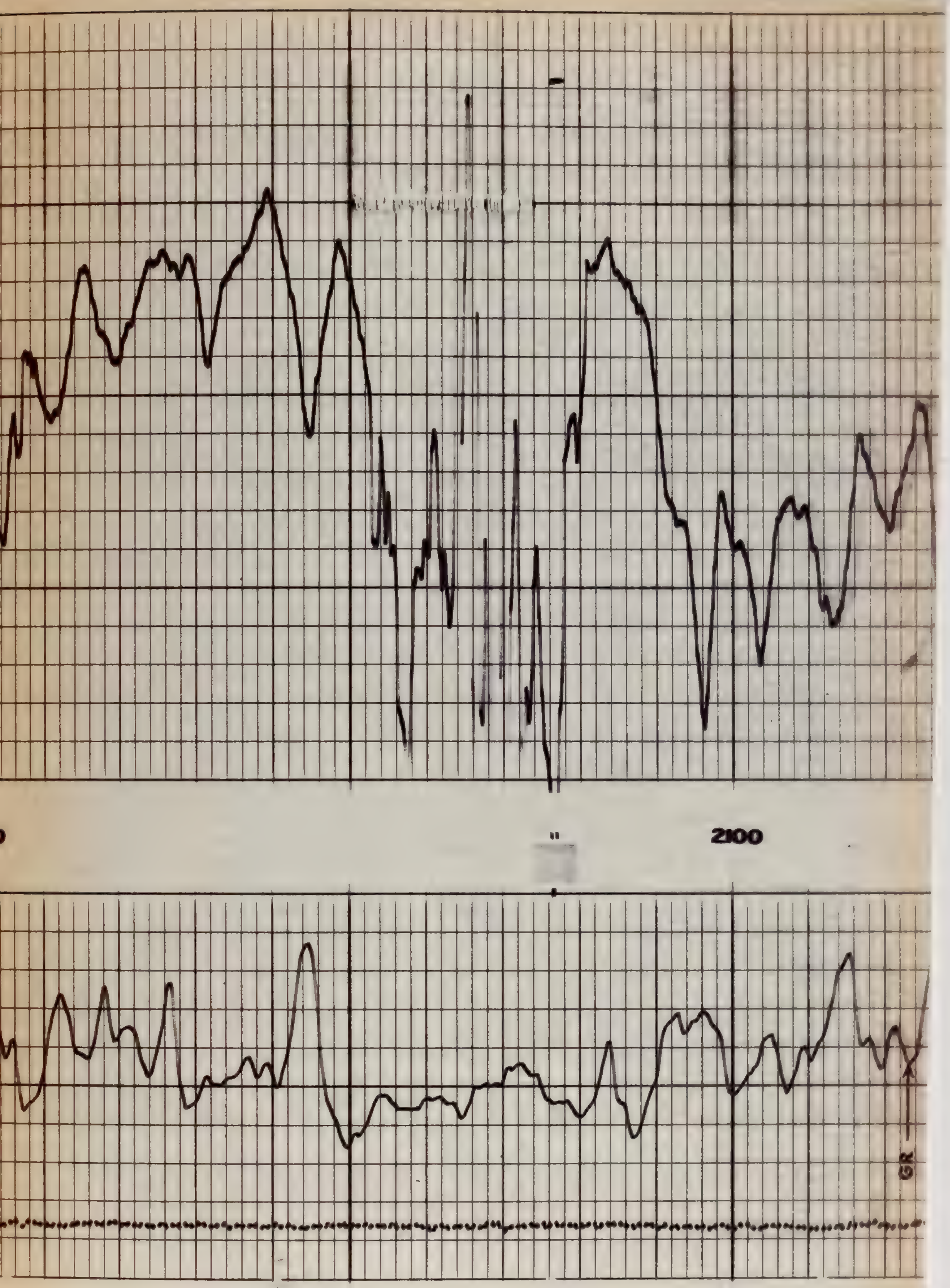



1900
200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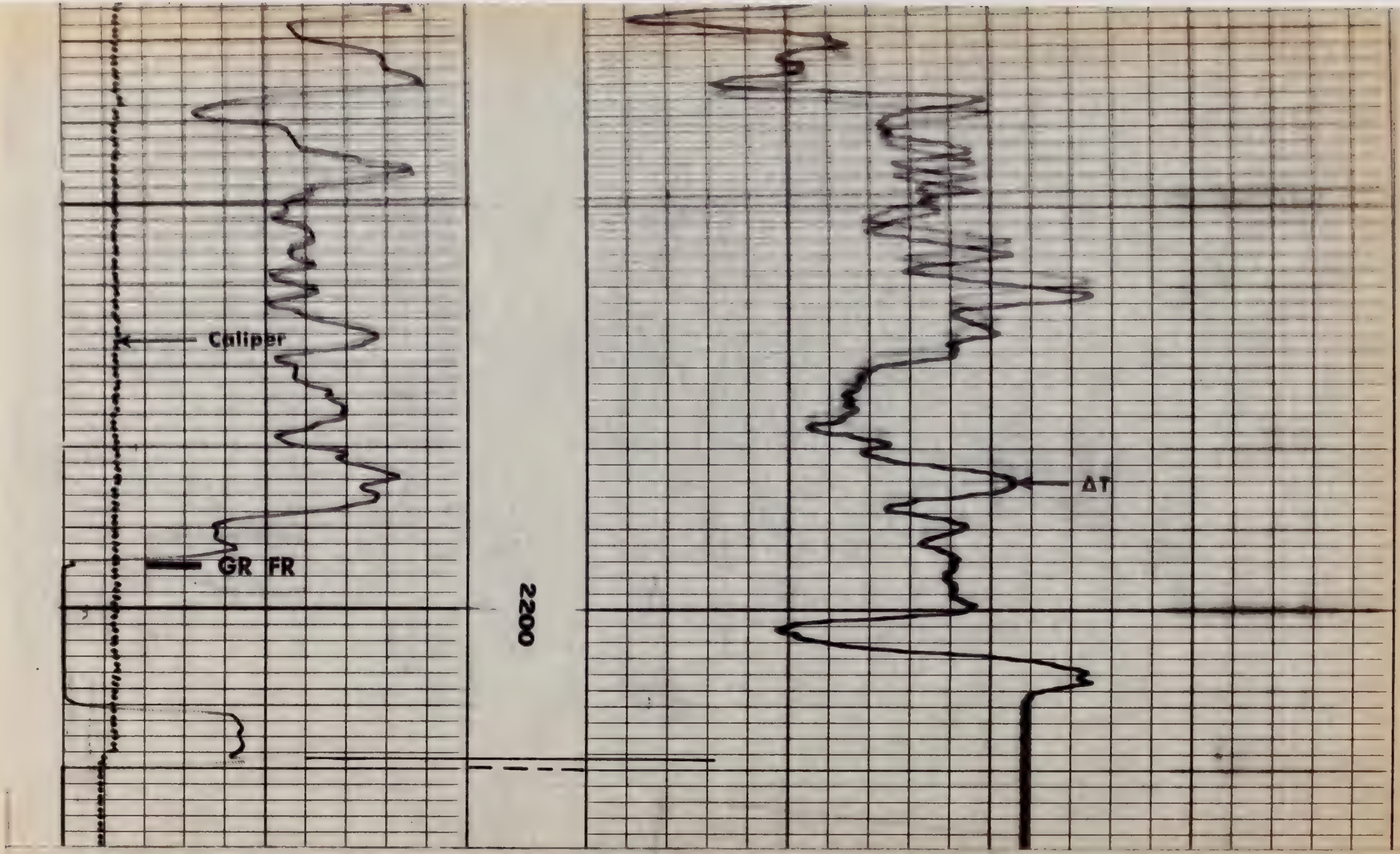
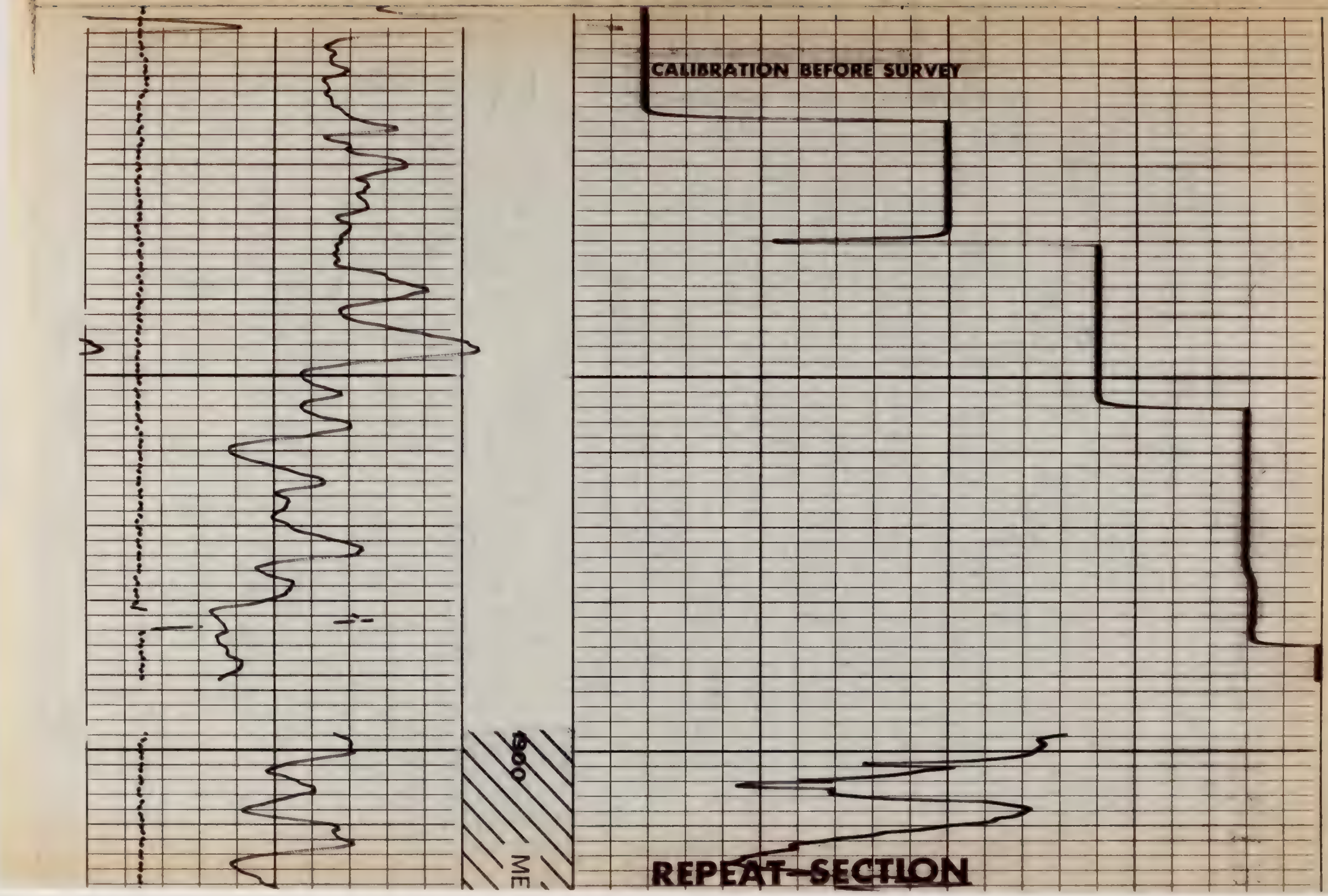
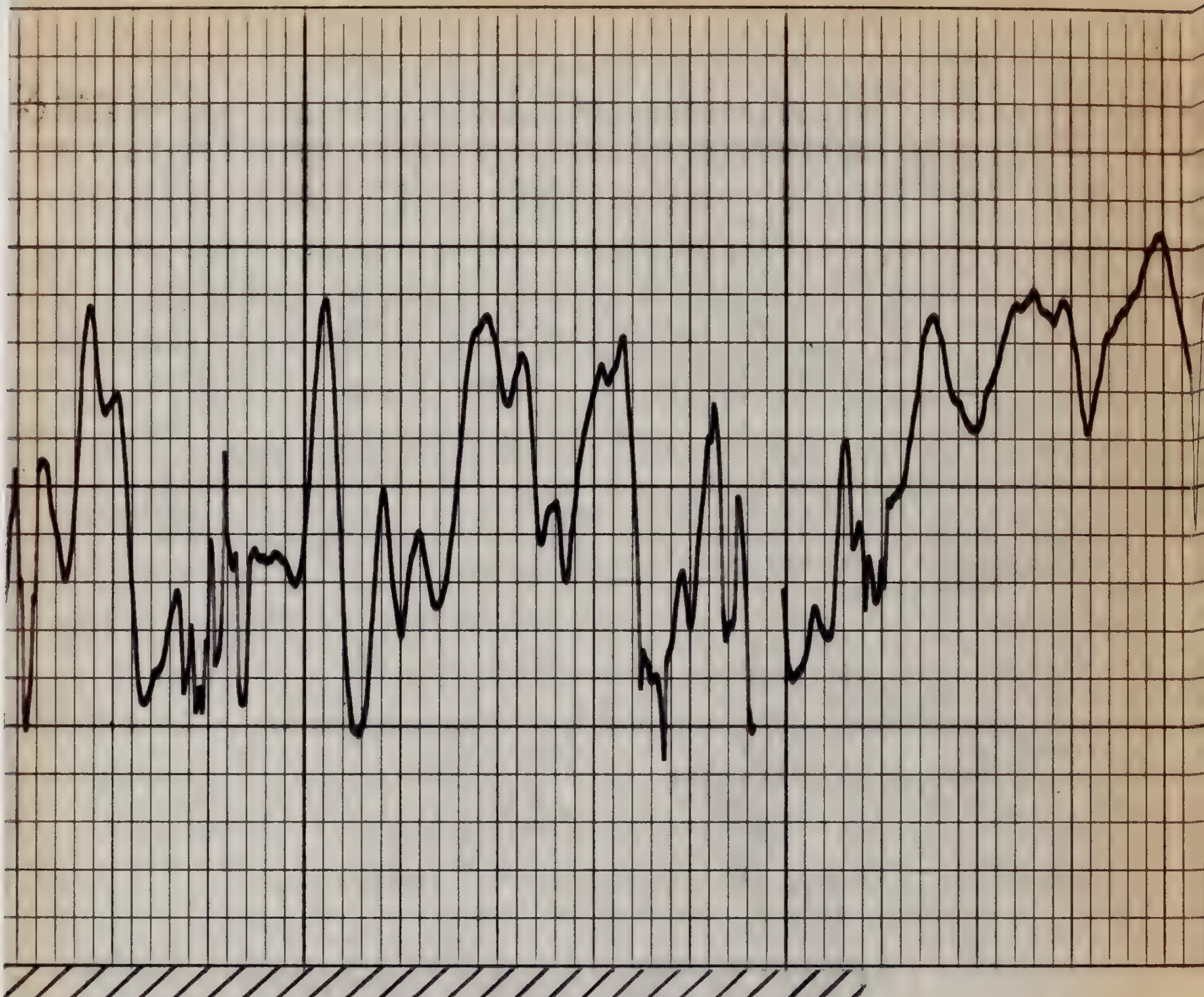
GR


Caliper
GR FR
2200
ΔT


CALIBRATION BEFORE SURVEY
REPEAT SECTION
1900
ME


MORIZER OUT — CURVES INVALID
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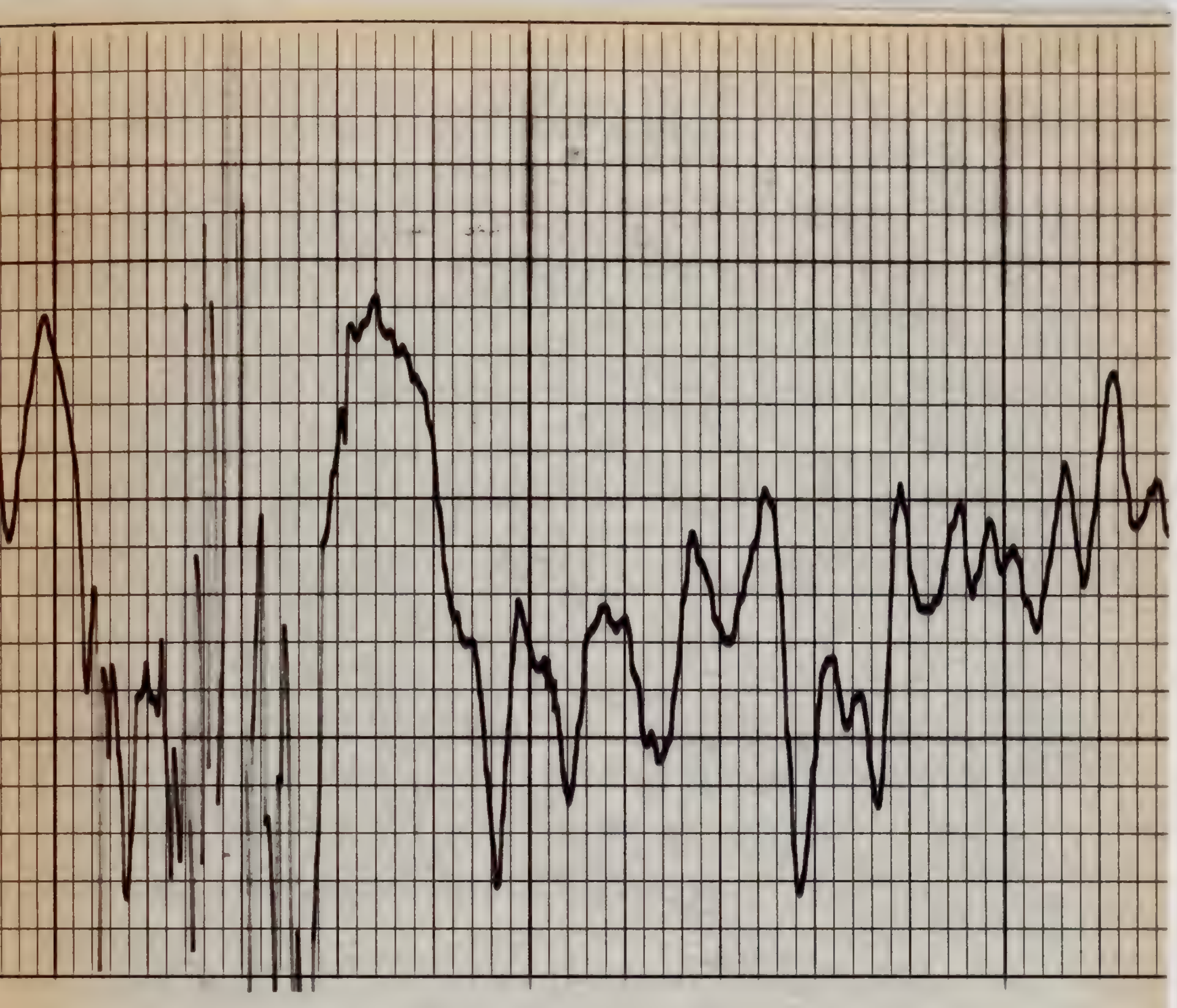
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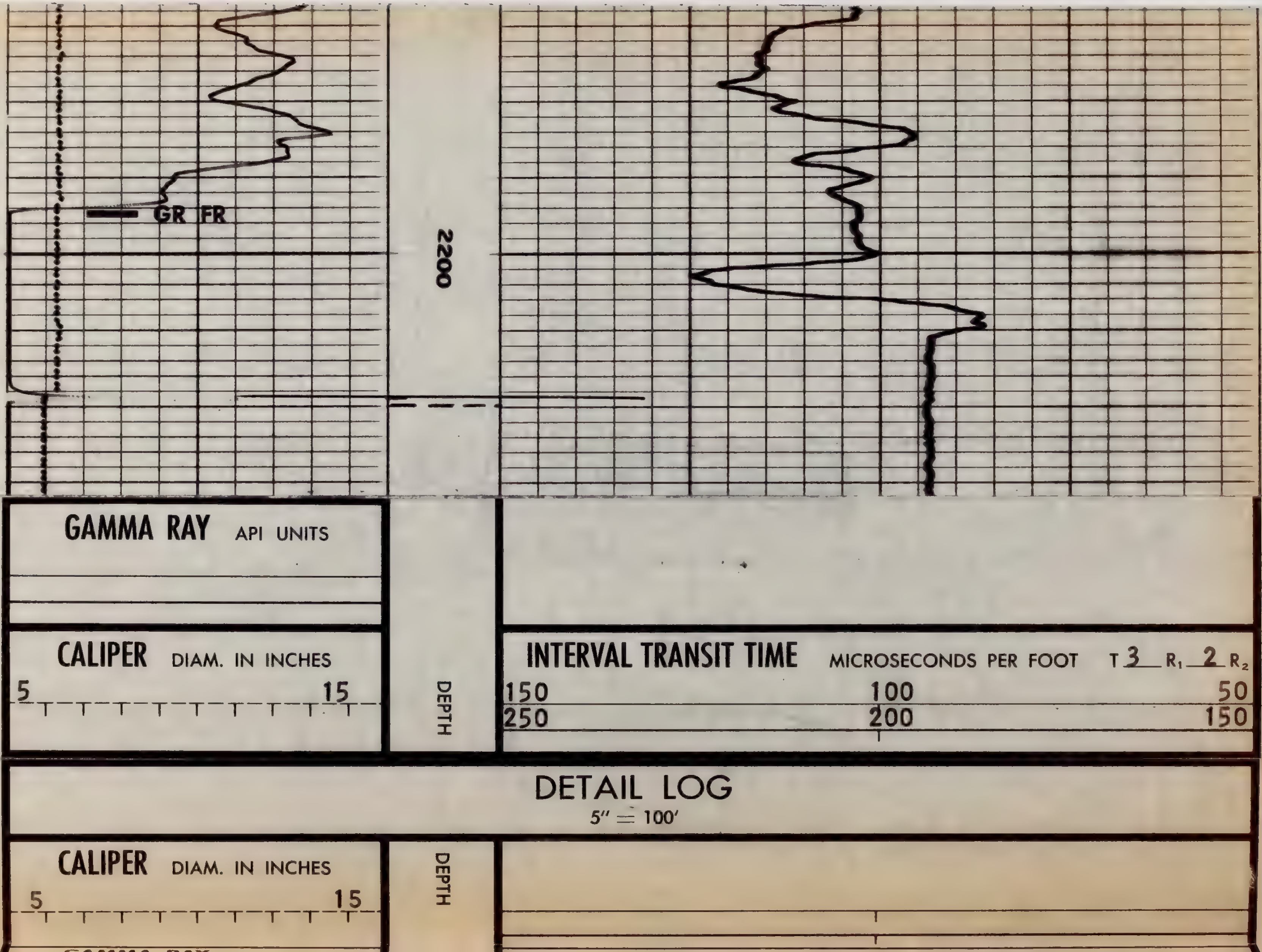
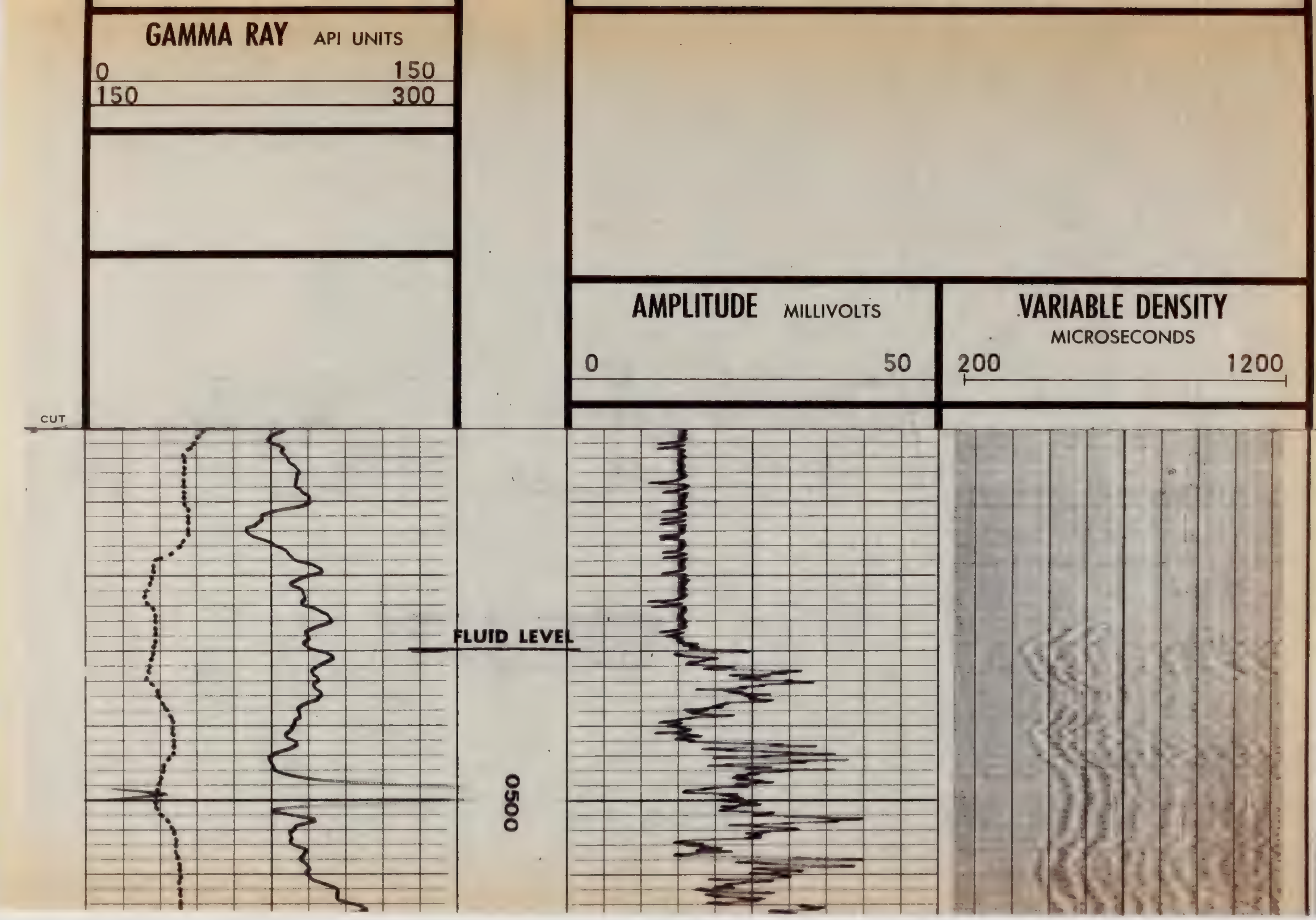
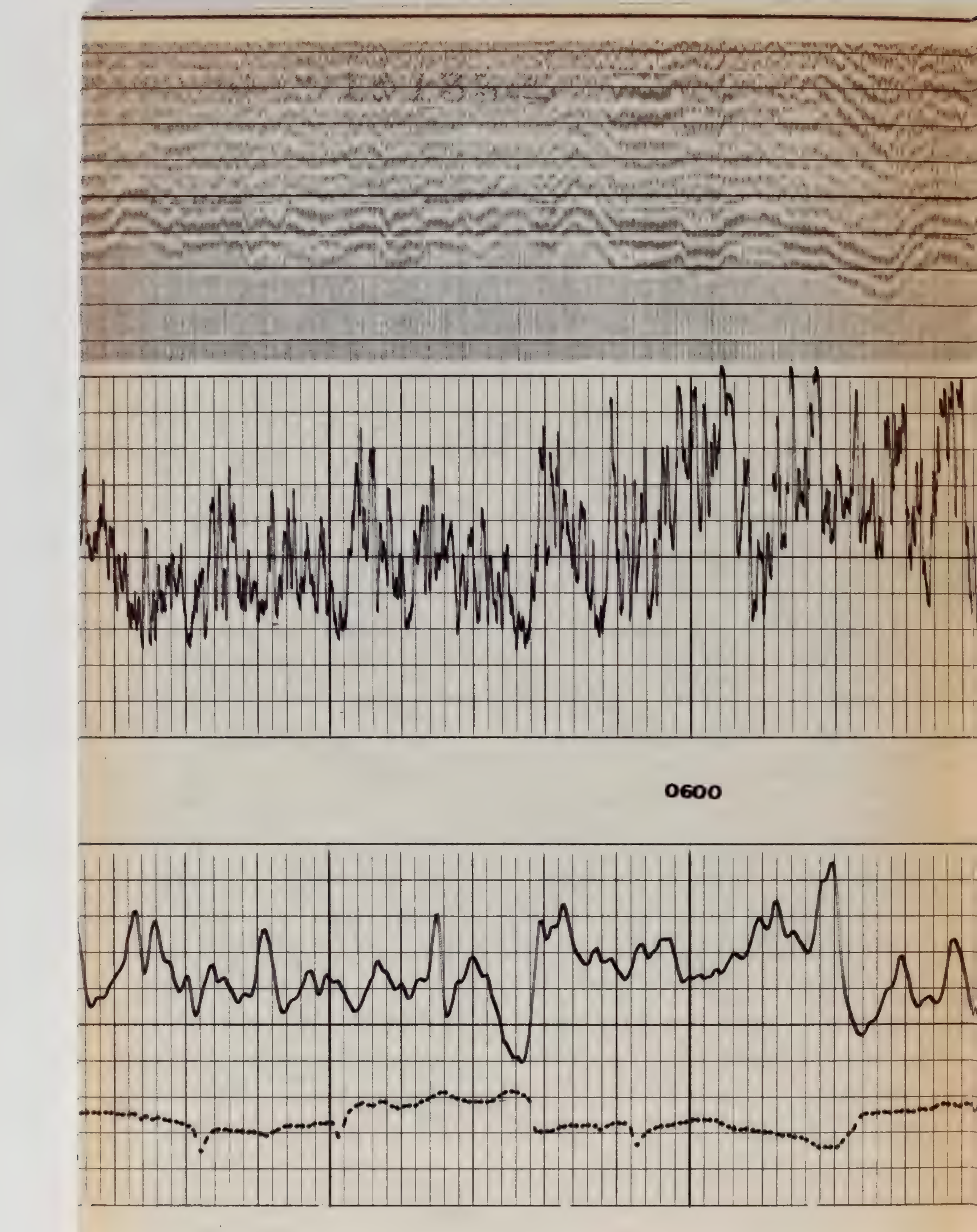
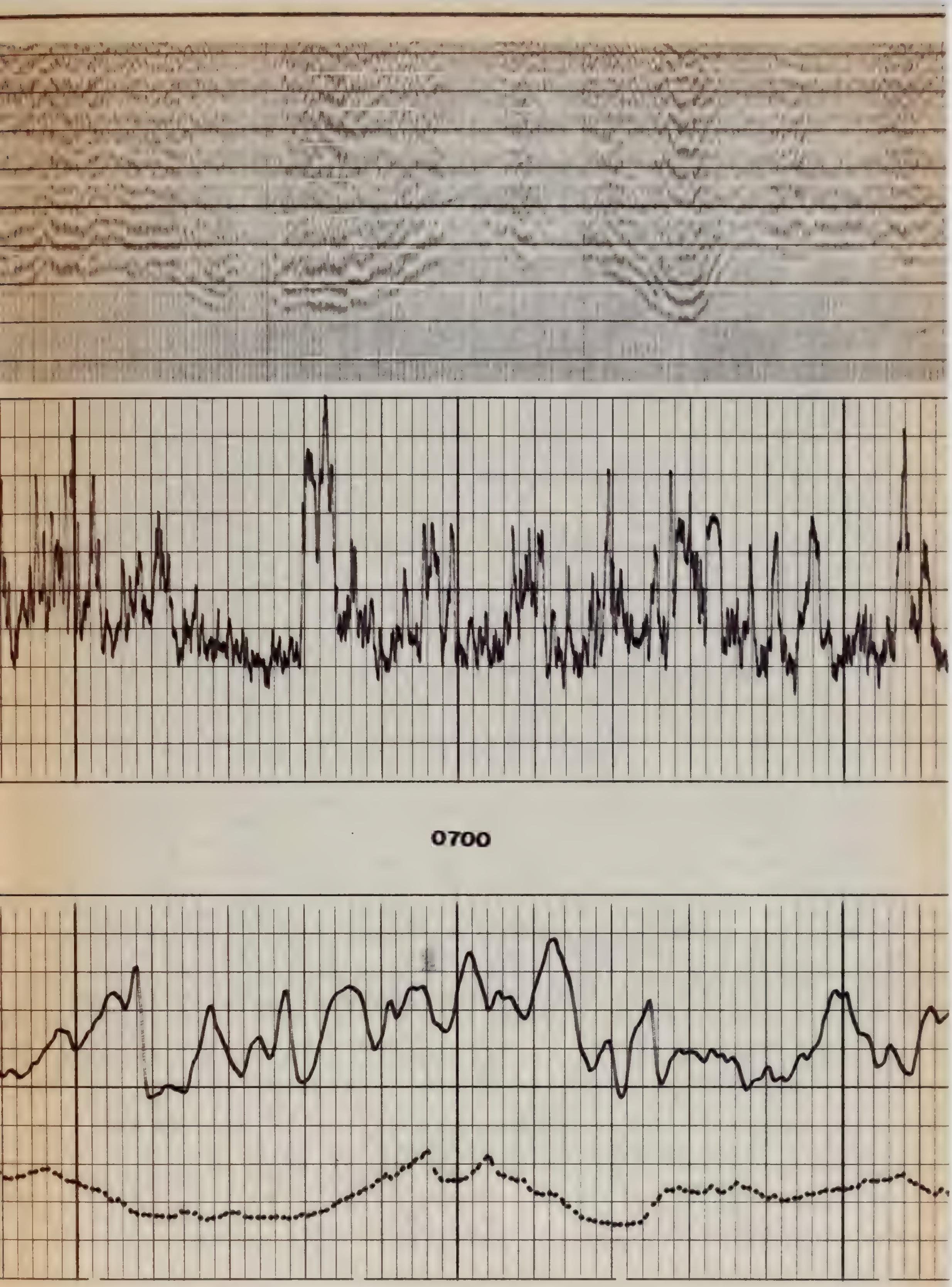
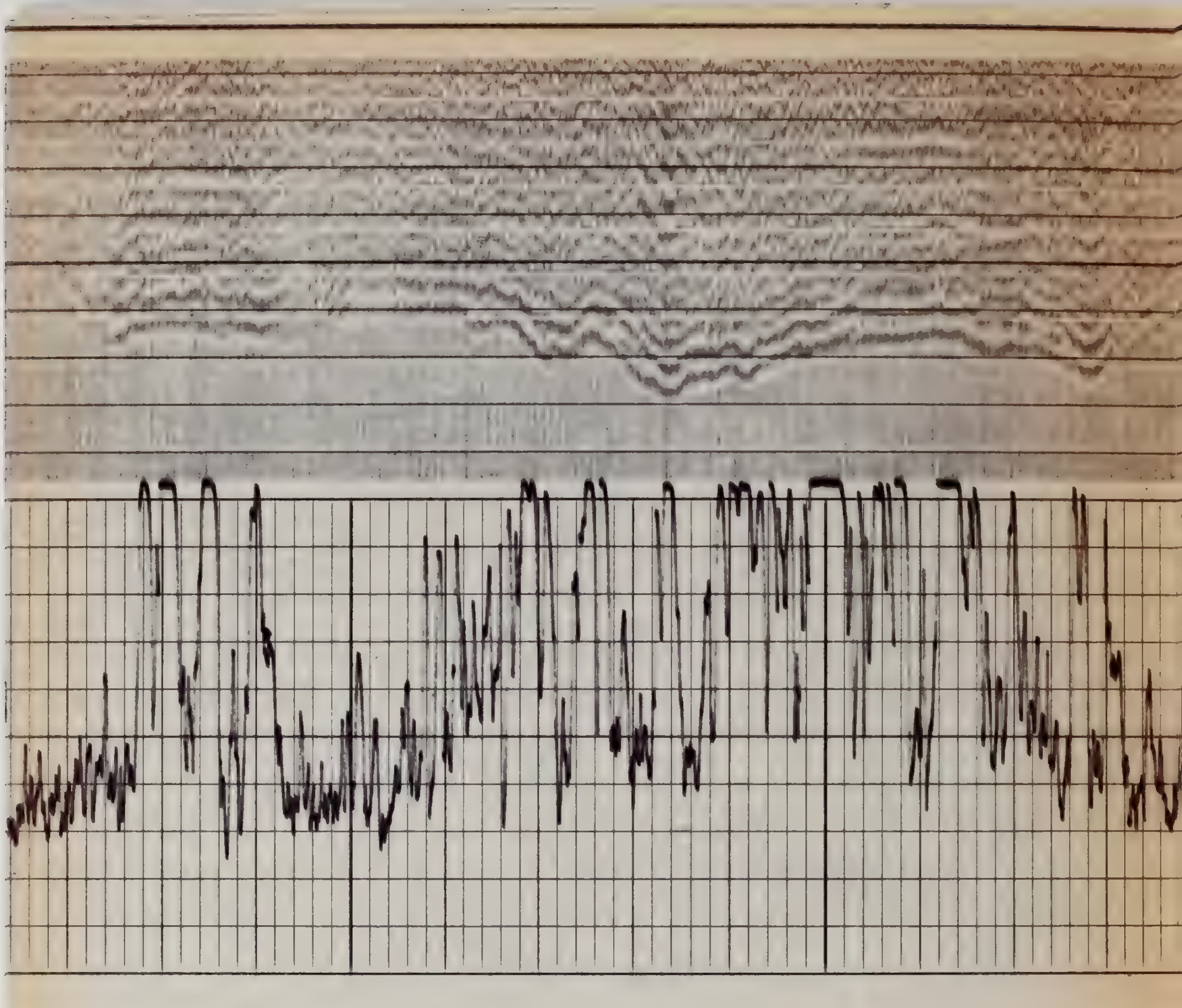

GR FR
2200
GAMMA RAY API UNITS
CALIPER DIAM. IN INCHES
5
15
DEPTH
INTERVAL TRANSIT TIME MICROSECONDS PER FOOT T 3 R₁ 2 R₂
150 100 50
250 200 150
DETAIL LOG
5″ = 100′
CALIPER DIAM. IN INCHES
5
15
DEPTH


GAMMA RAY API UNITS
0
150
150
300
AMPLITUDE MILLIVOLTS
0
50
VARIABLE DENSITY
MICROSECONDS
200
1200
CUT
FLUID LEVEL
0500


0600


0700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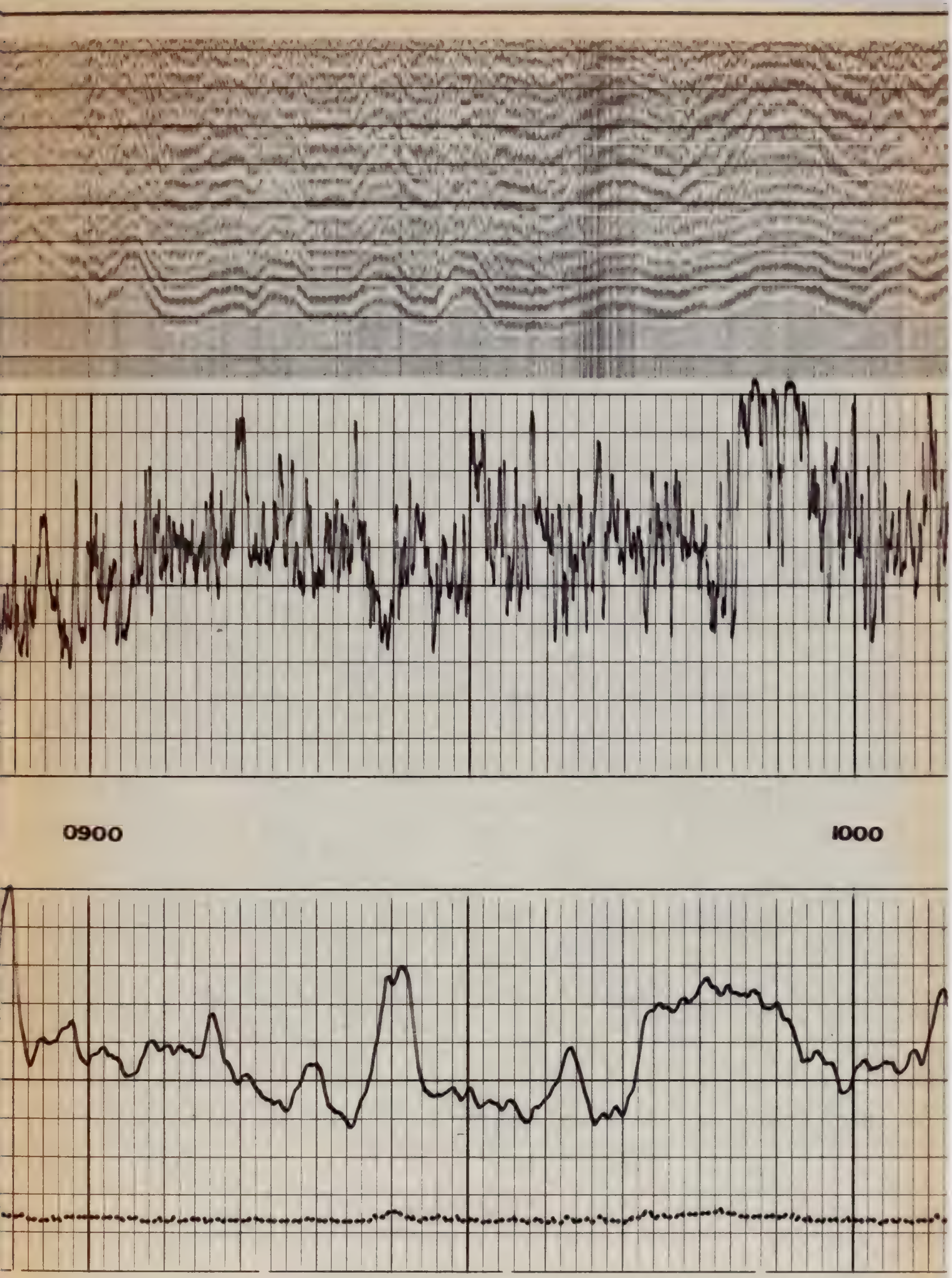
0900
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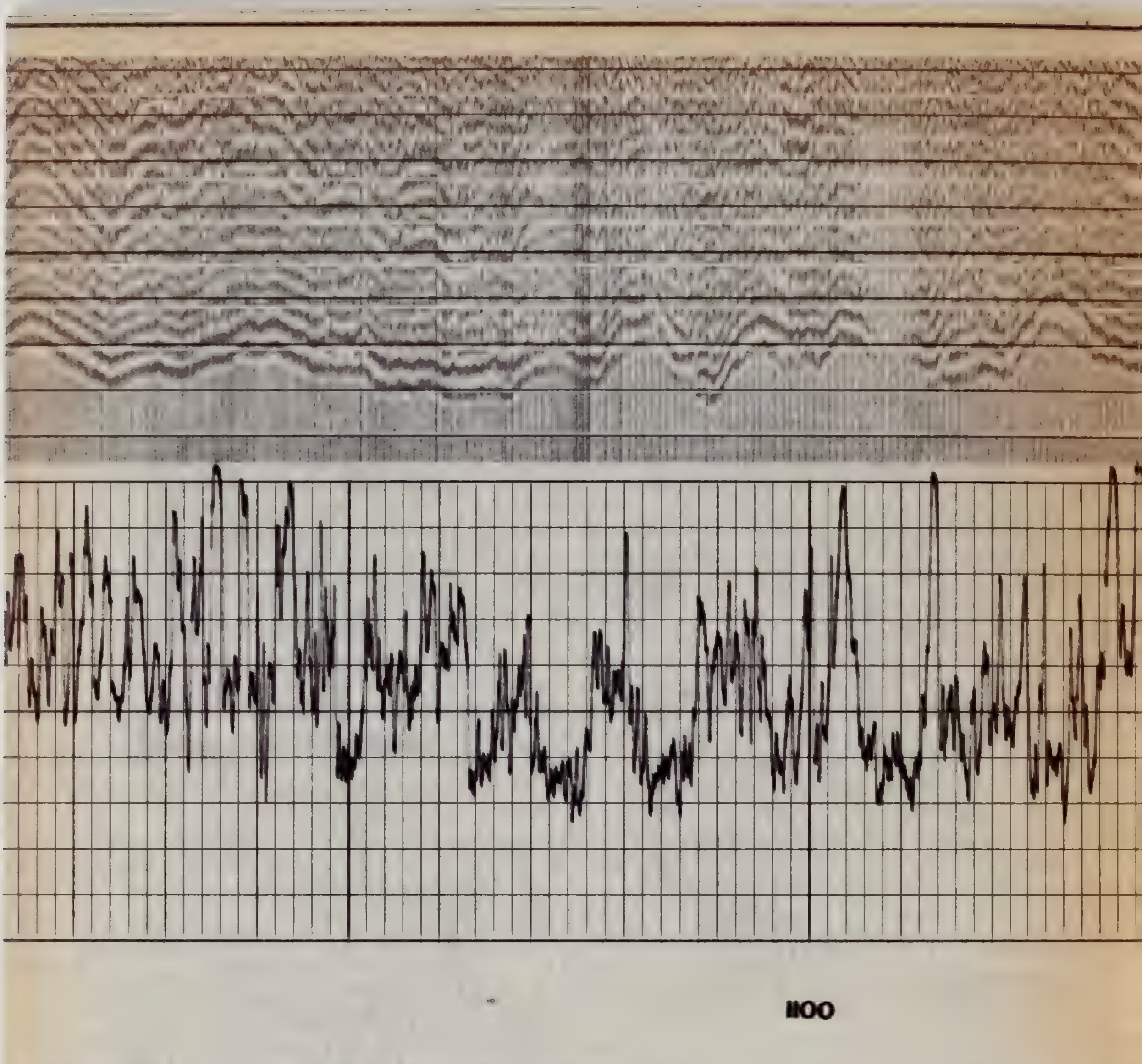
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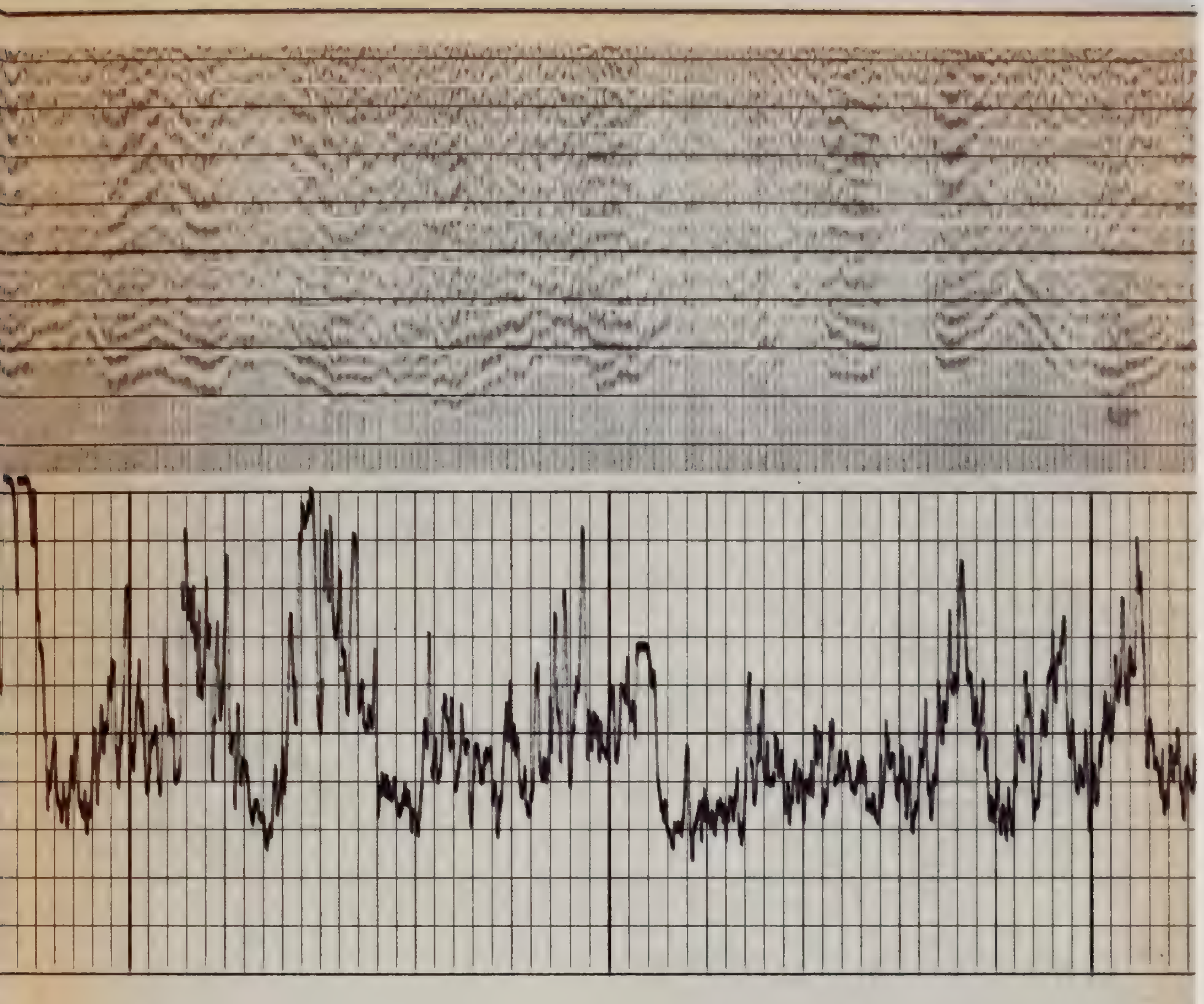
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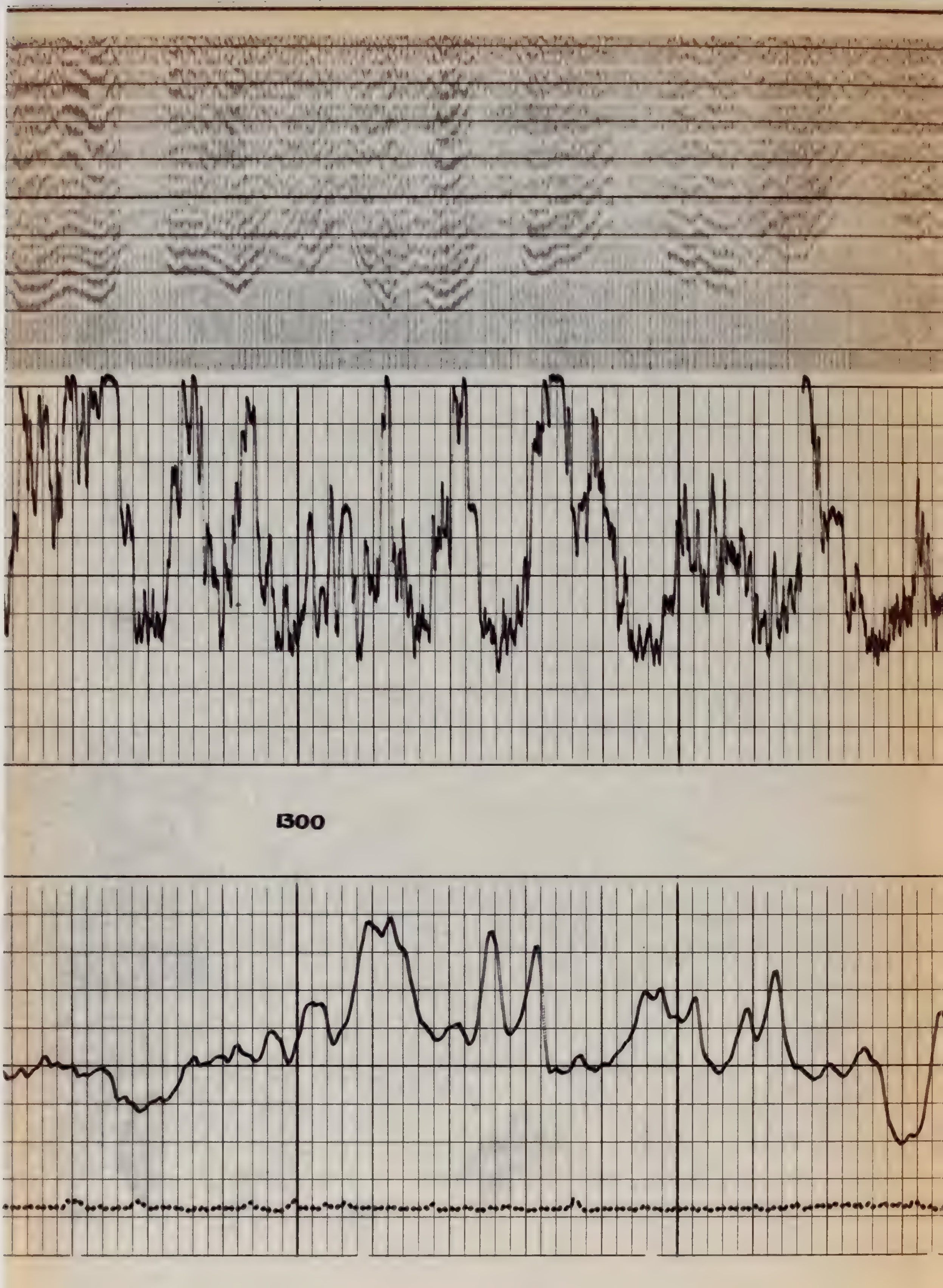
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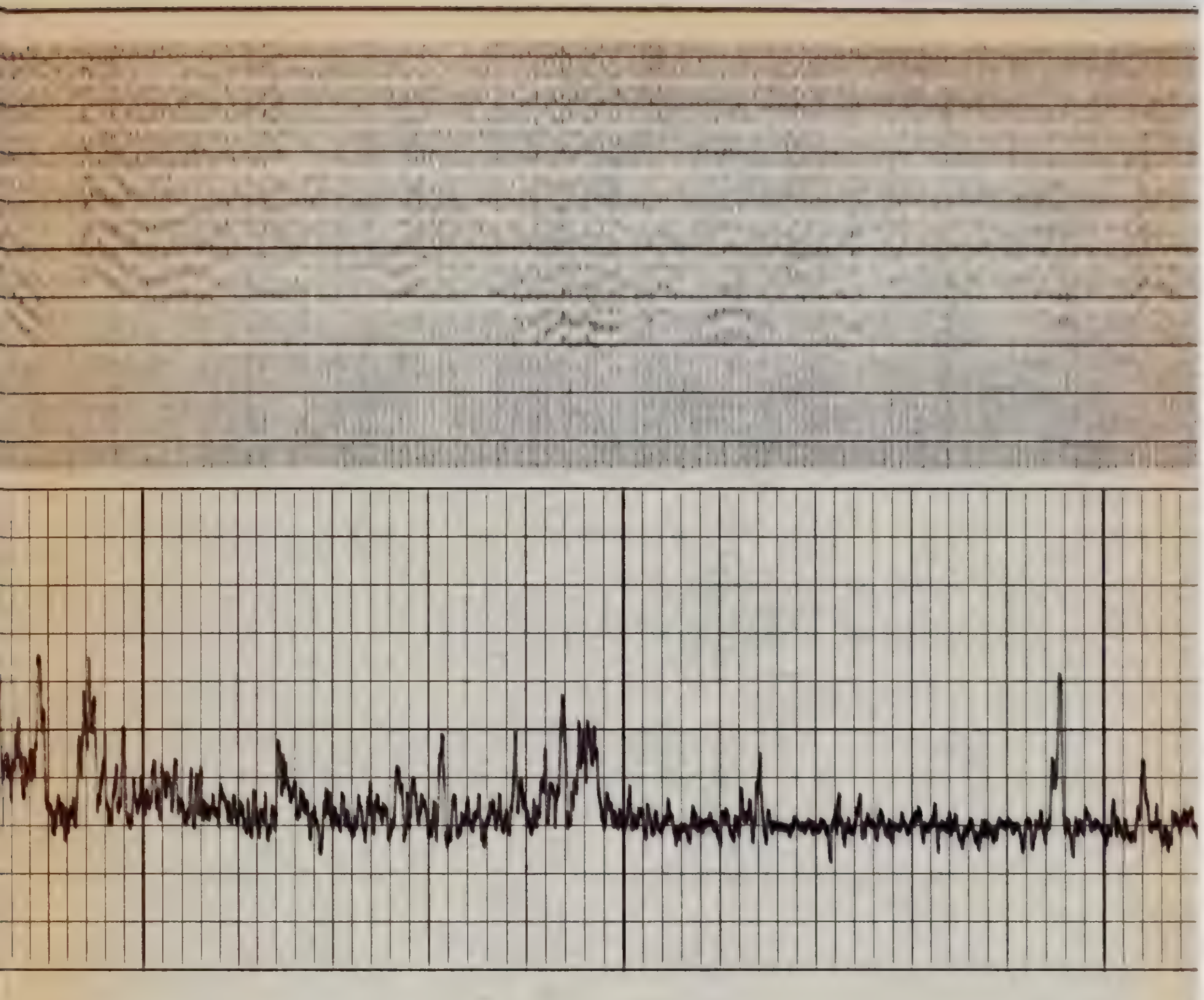
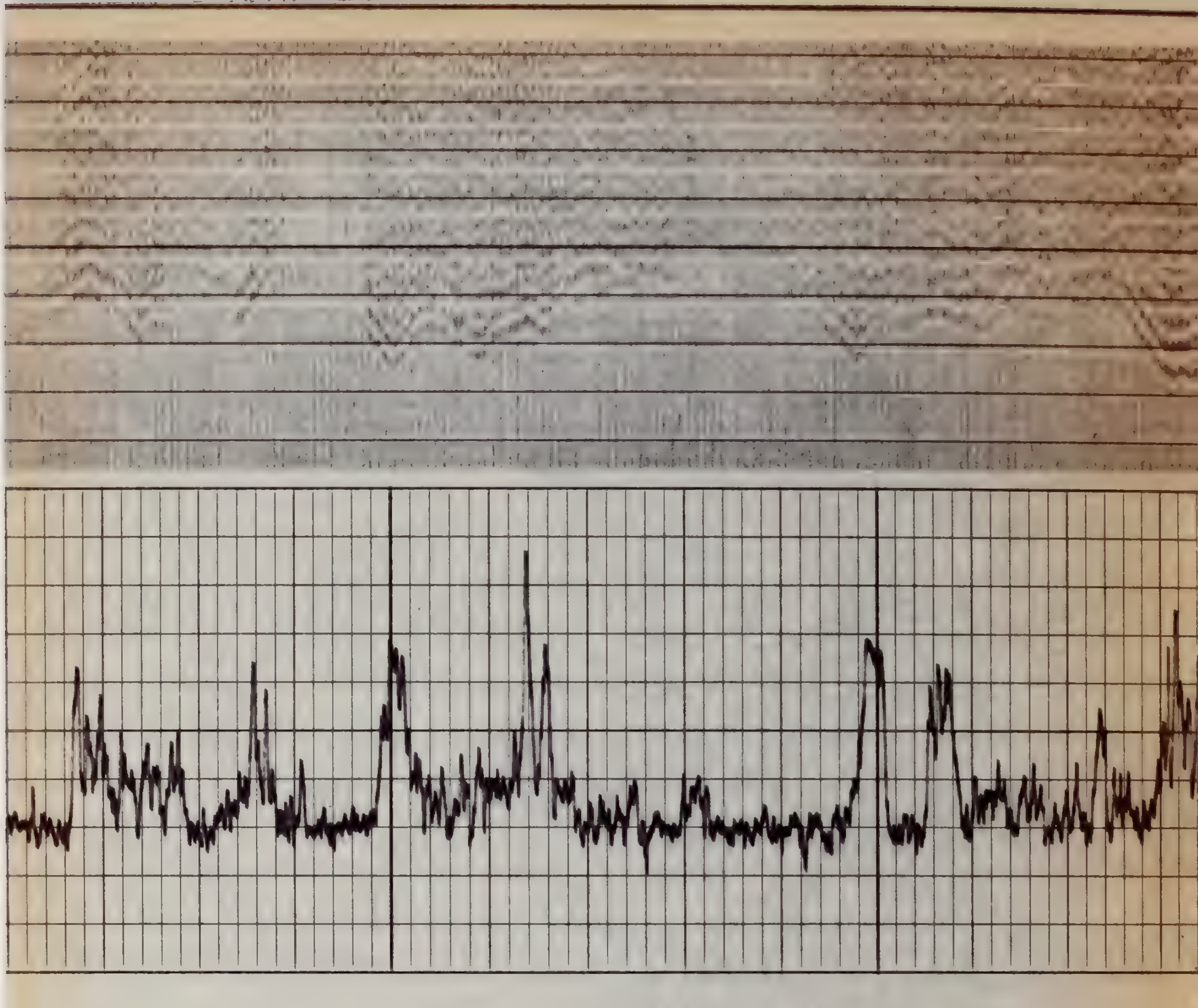

1400
1500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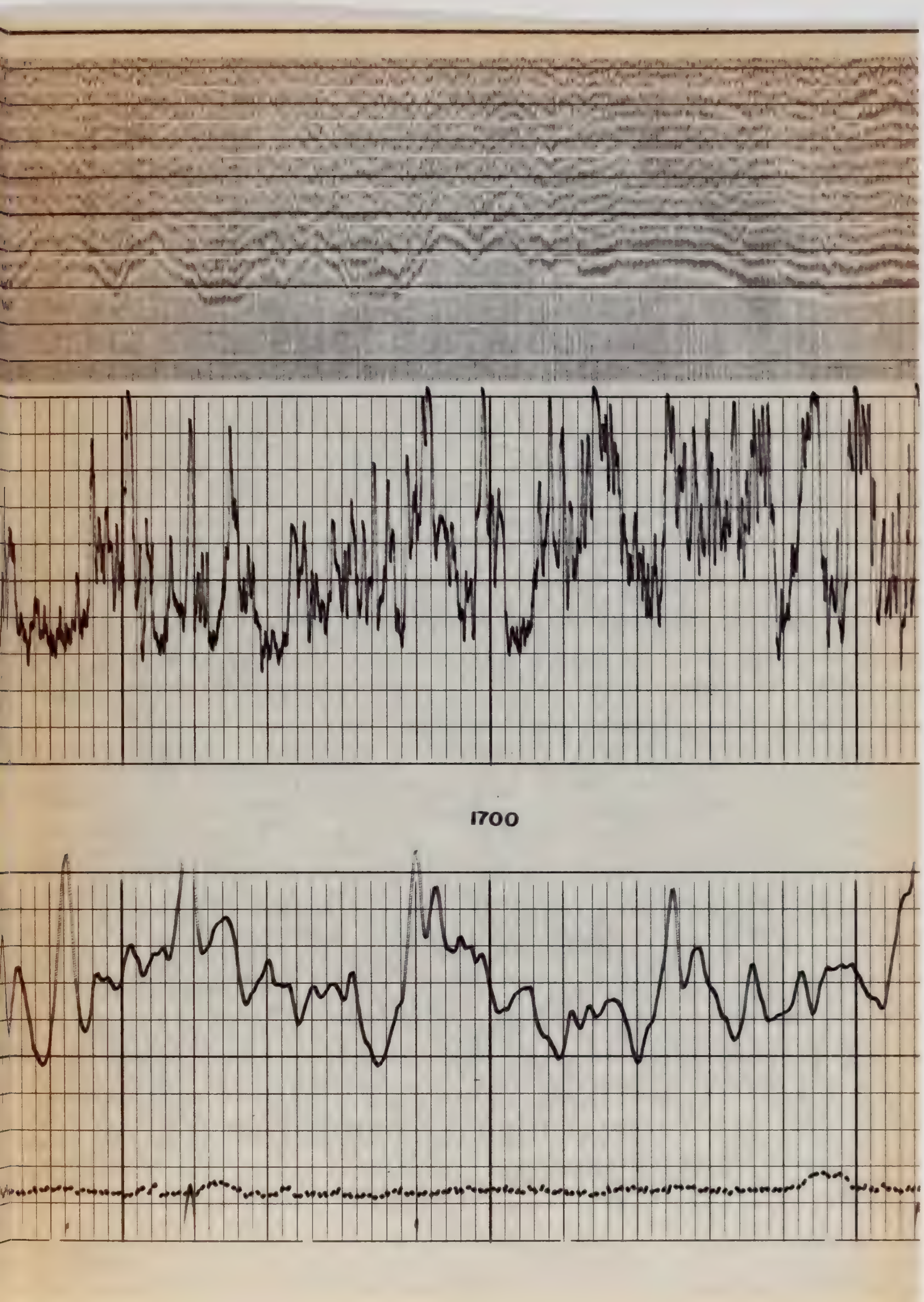
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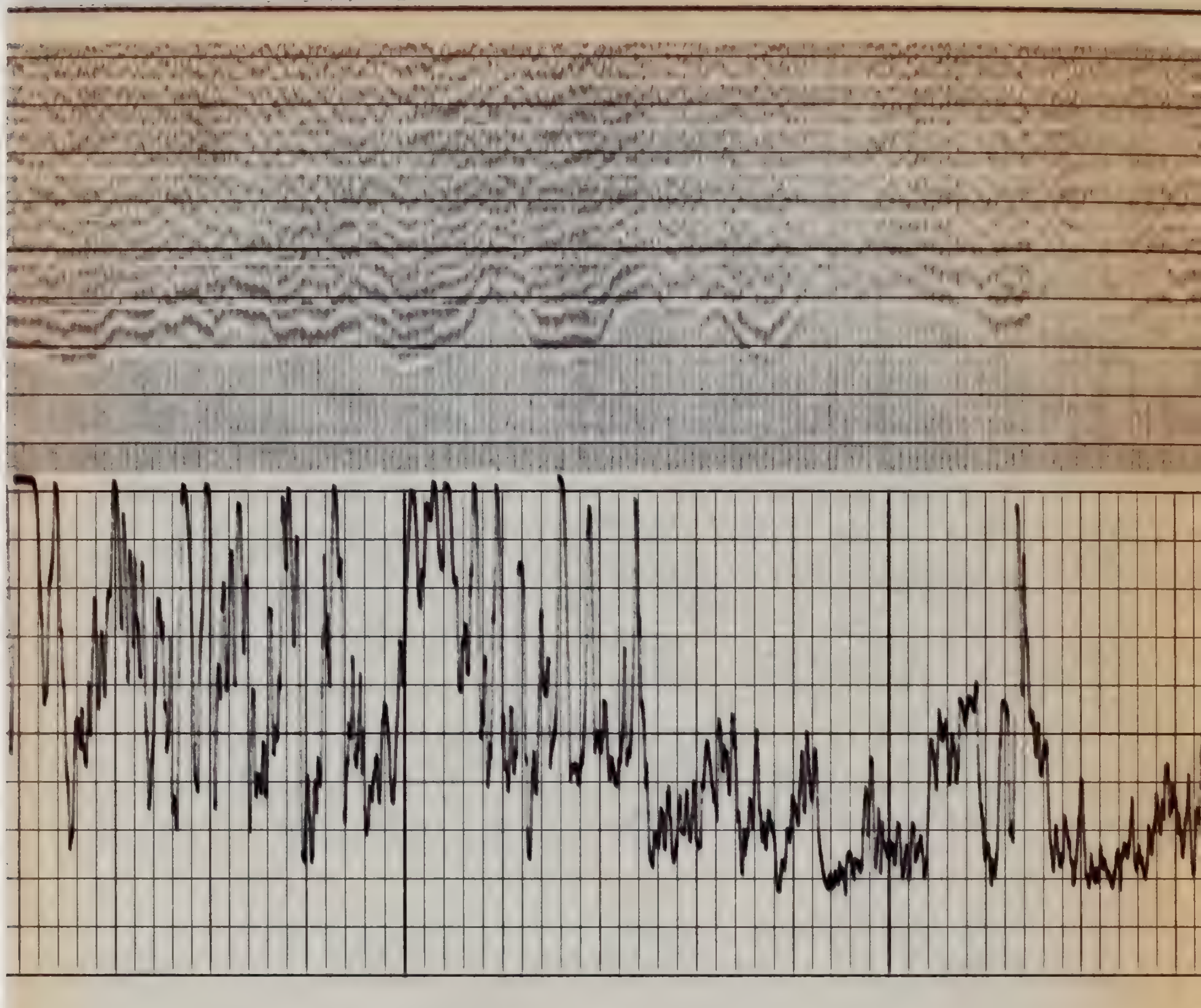
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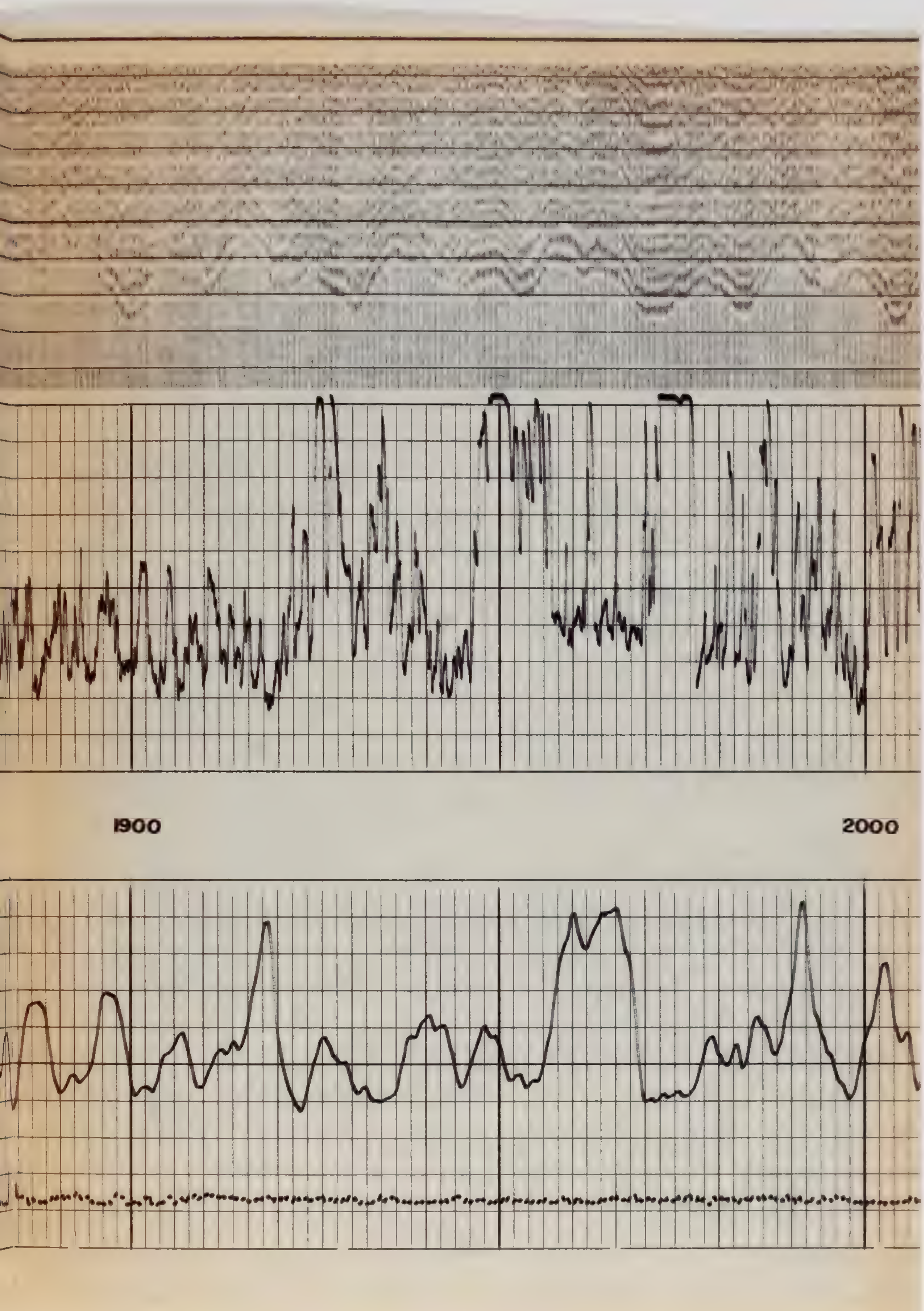
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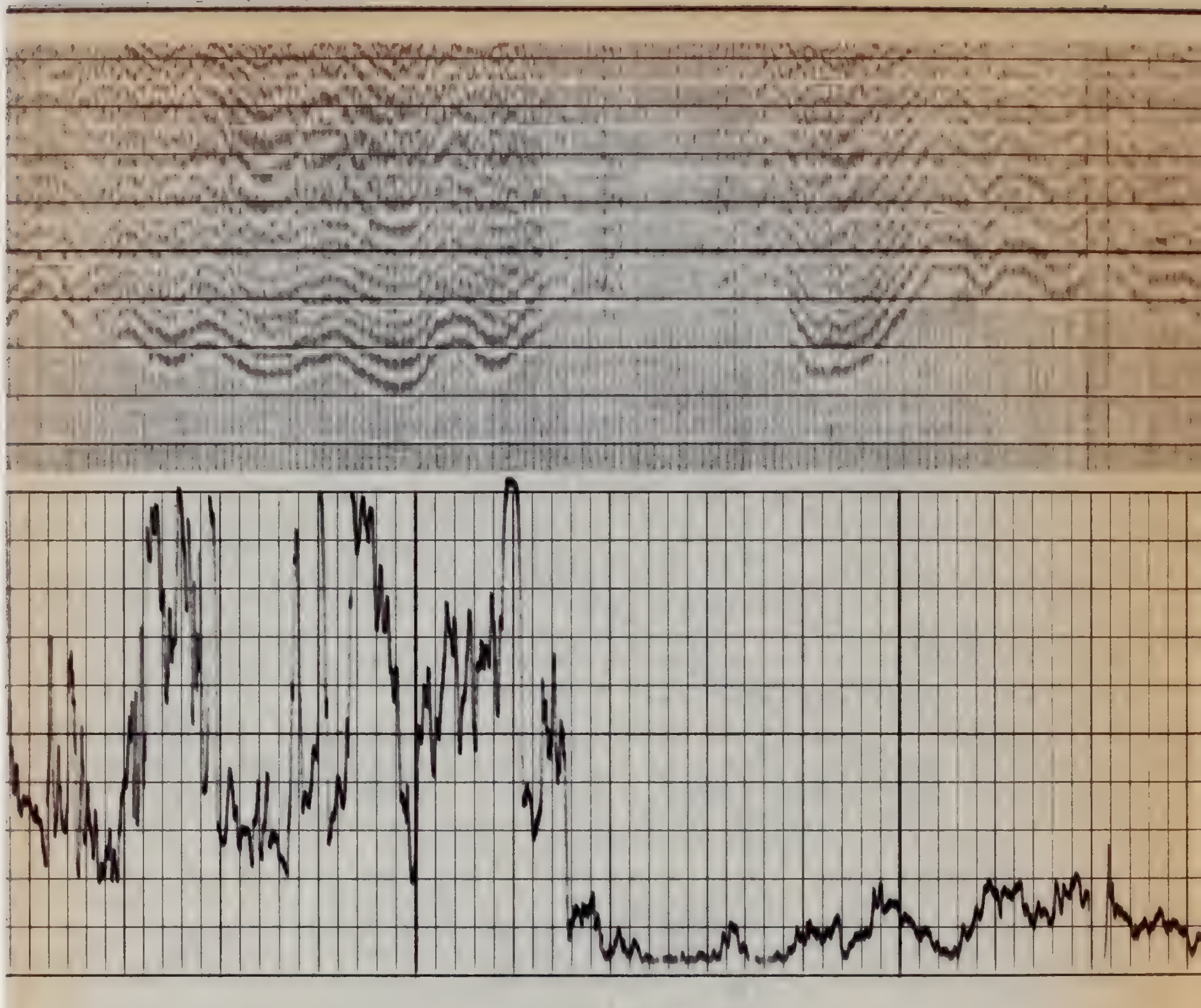
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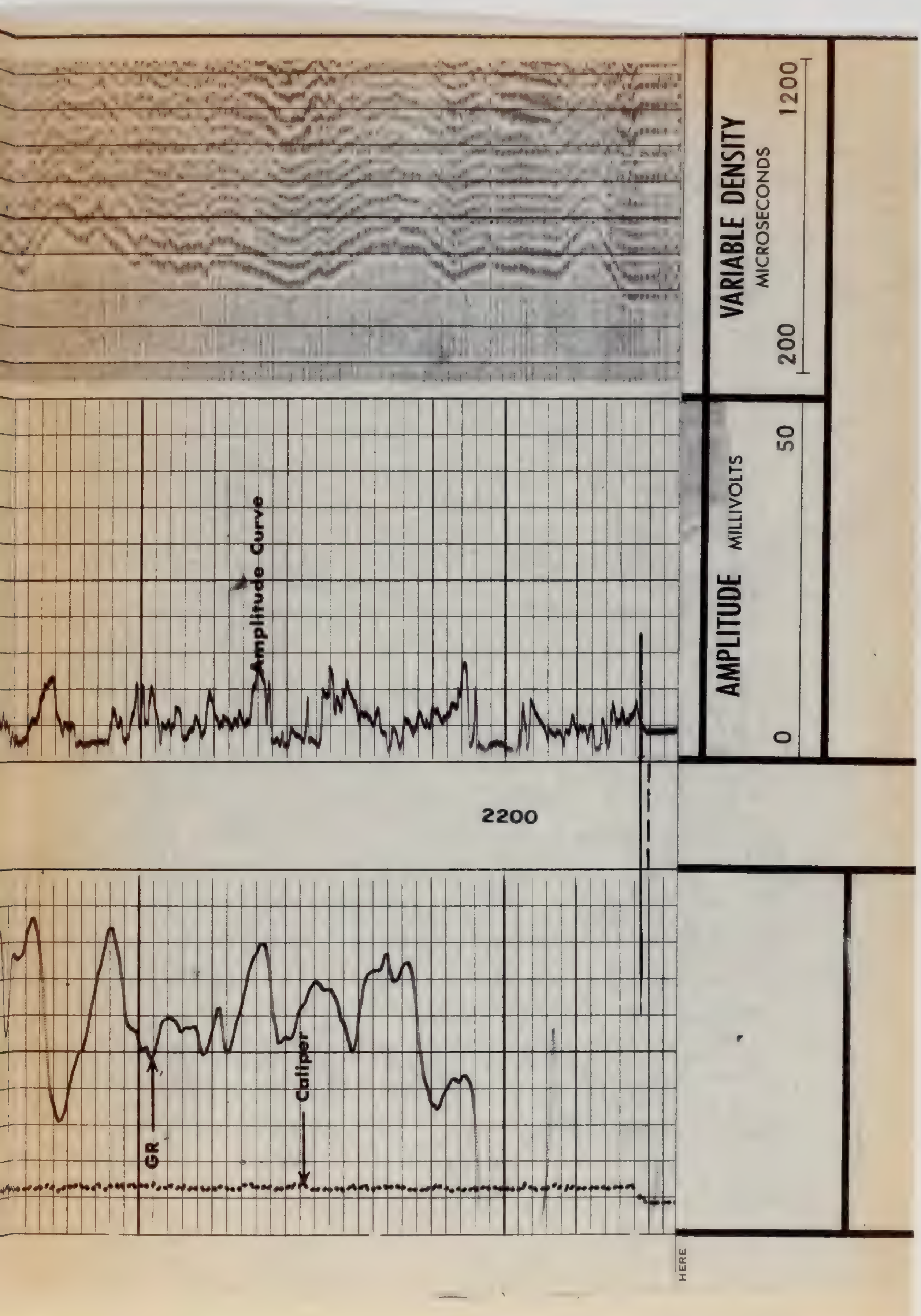

VARIABLE DENSITY
MICROSECONDS
200
1200
AMPLITUDE MILLIVOLTS
0
50
Amplitude Curve
2200
GR
Caliper
HERE

GAMMA RAY API UNITS

0 150

150 300

CALIPER DIAM. IN INCHES

5 15

DEPTH

COMPANY THE ATLANTIC RICHFIELD COMPANY

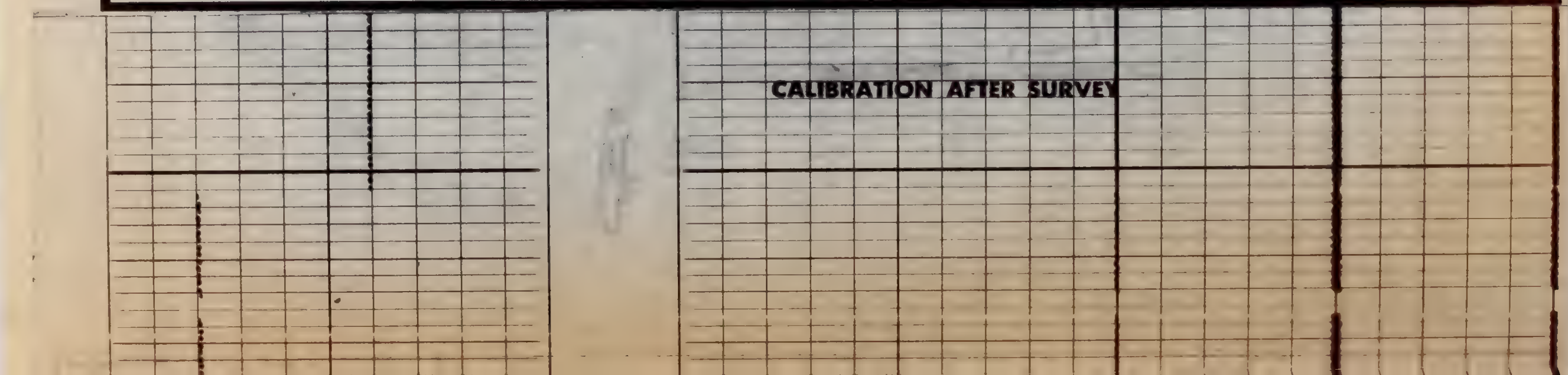
WELL SORGHUM GULCH #6

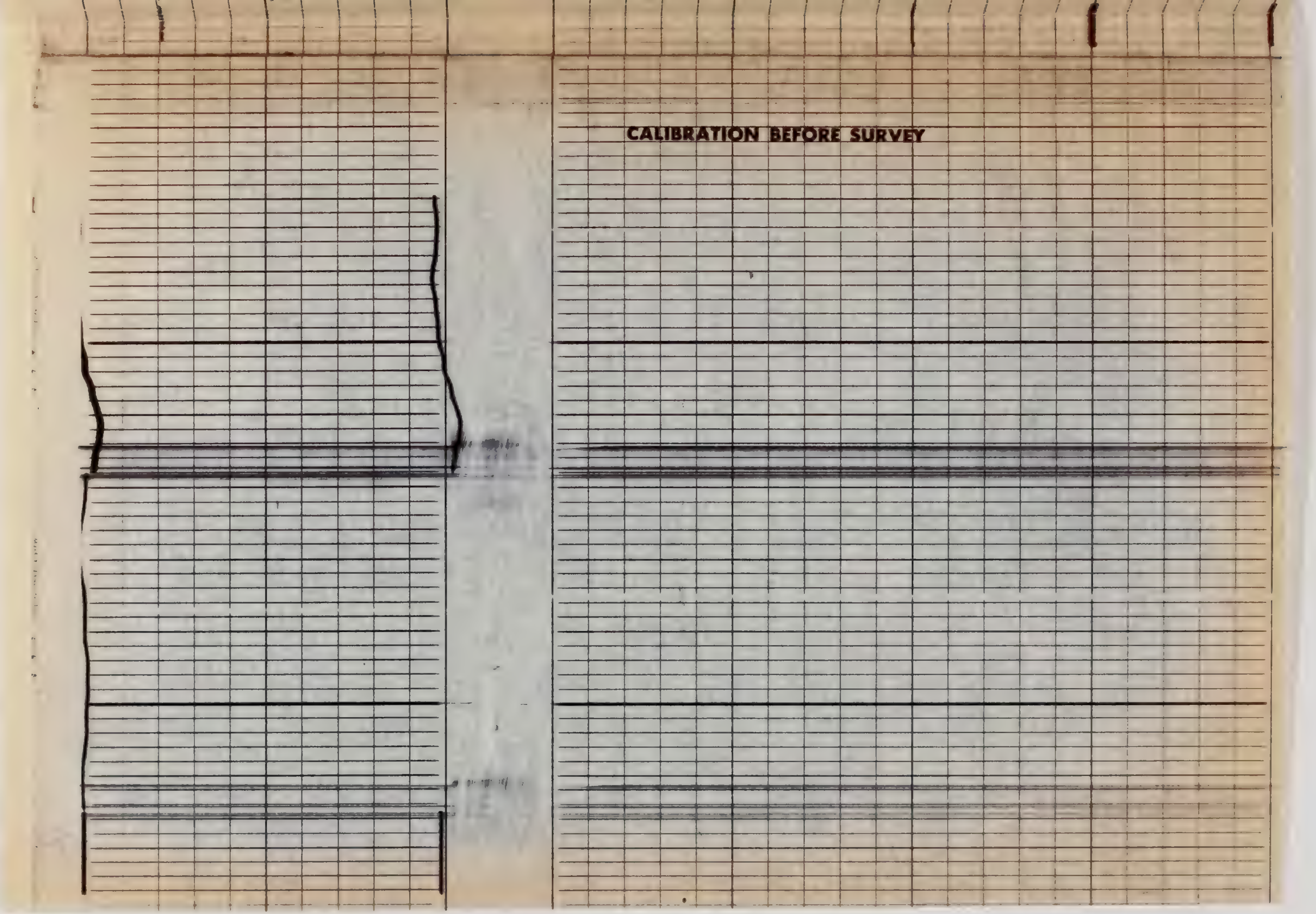
FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 2219
SCHL. TD 2220
DRLR TD 2220
Elev:
KB
DF
GL 6888

CALIBRATION RECORD




CALIBRATION BEFORE SURVEY

CALIBRATION RECORD

COMPANY THE ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH #6

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 2219
SCHL. TD 2220
DRLR TD 2220
Elev:
KB
DF
GL 6888

SWS–1129-D

Schlumberger

CEMENT BOND LOG

VDL-CCL

COUNTY RIO BLANCO
Field or LOCATION SORGHUM GULCH
WELL S.G. NO. 9
COMPANY ATLANTIC RICHFIELD COMPANY

COMPANY ATLANTIC RICHFIELD COMPANY

WELL S.G. NO.9

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

LOCATION API Serial No.

Sec. 11 Twp. 3S Rge. 97W

Other Services: [illegible]

Permanent Datum: GROUND LEVEL, Elev. 6870
Log Measured From GL, 0 Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B. ----
D.F. ----
G.L. 6870

Date	10/29/74		Type Drill Fluid	WATER
Run No.	NO.1STRING	NO.2STR.	Fluid Level	FULL
Depth — Driller	----	----	Max. Rec. Temp.	---- °F
Depth — Logger	2720	1338	Est. Cement Top	830
Btm. Log Interval	2712	1330	Equip. | Location	3862 | VERNAL
Top Log Interval	700	700	Recorded By	ST. AUBYN
Open Hole Size	7 7/8		Witnessed By	MR. BURNS

CASING REC.	Size	Wt/Ft	Grade	Type Joint	Top	Bottom
Surface String	8 5/8			T&C	SURF	[illegible]
String (1)	2 3/8	4.7		T&C	SURF	2740
String (2)	2 3/8	4.7		T&C	SURF	1330
Liner						

PRIMARY CEMENTING DATA

STRING	Surface	Protection	Production	Liner
Vol. of cement			425 SKS	
Type of cement			HOWCO LT. WT.	
Additive			10#/SK-GILSONITE	
Retarder				
Wt. of slurry				
Water loss				
Type fluid in csg.				
Fluid wt.				

FOLD HERE

The well name, location and borehole reference data were furnished by the customer.

PRIMARY CEMENTING PROCEDURE	Hour — date	Hours from start of operation
Started pumping cement	22:30-10/25/74	
Release pressure	23:30-10/25/74	
Start Cement Bond Log	08:00-10/29/74	
Finish Cement Bond Log	19:00-10/29/74	

REMARKS

Service Order No. 2

Csg. Collars Recorded 15 ft. DEEP

Preceding fluid________ Volume________ bbls.

Cement pumped________ bbls./minute

Pipe reciprocated during Pumping: Yes____ No____

Pipe reciprocated after plug down: Yes____ min., No____

SQUEEZE JOB DETAIL		
Squeeze number	1	2
Date		
Depth interval		
Type cement		
Volume of cement		
Additive		
Retarder		
Weight of slurry		
Preceding fluid		
Breakdown pressure		
Max. pressure-stage 1		
" " " 2		
" " " 3		
Final maximum pressure		
Started pumping cement		
Released pressure		
Start CBL		
Finish CBL		

EQUIPMENT DATA	Centralizer Depths	Scratcher Depths	
Sonic Panel No.	SLP-FH #37		
Sonic Cart No.	SLC-JD #83		
Sonic Sonde No.	SLS-JC #81		
CRP No.	14		
Mem Panel No.	----		
GR Panel No.	----		
GR Cart No.	----		
Centralizer: Type	CME-V	CAL-AJ	
No.	CME-W		
To Level (MV)	100		
Cart. Gain	1/20		
CRP Intensity	.1		
R9G Intensity	7 3/4		
Logging Speed	30 FPM		
Time Constant			

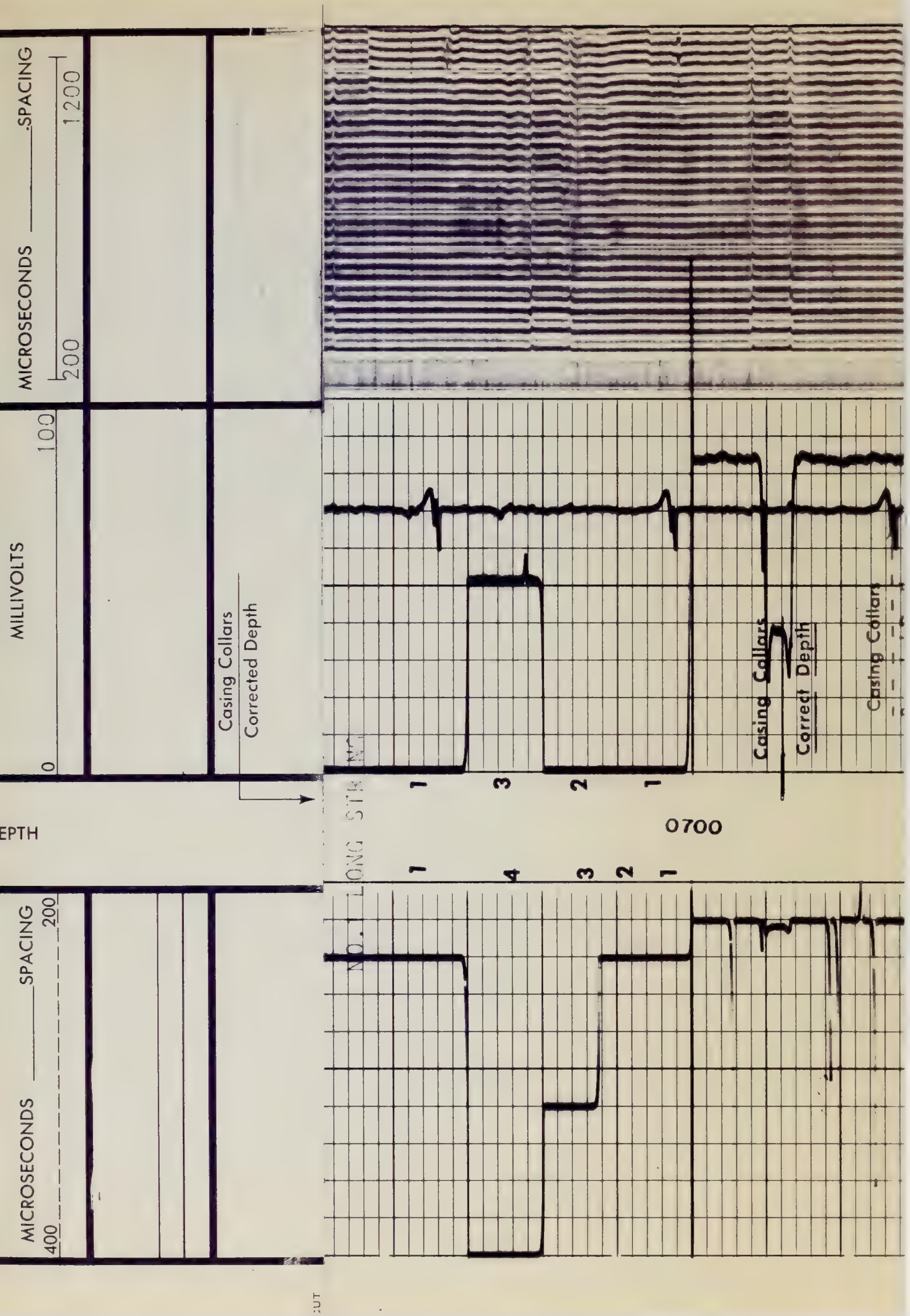
AVERAGE WELL DRIFT:
° from to ; ° from to ; ° from to

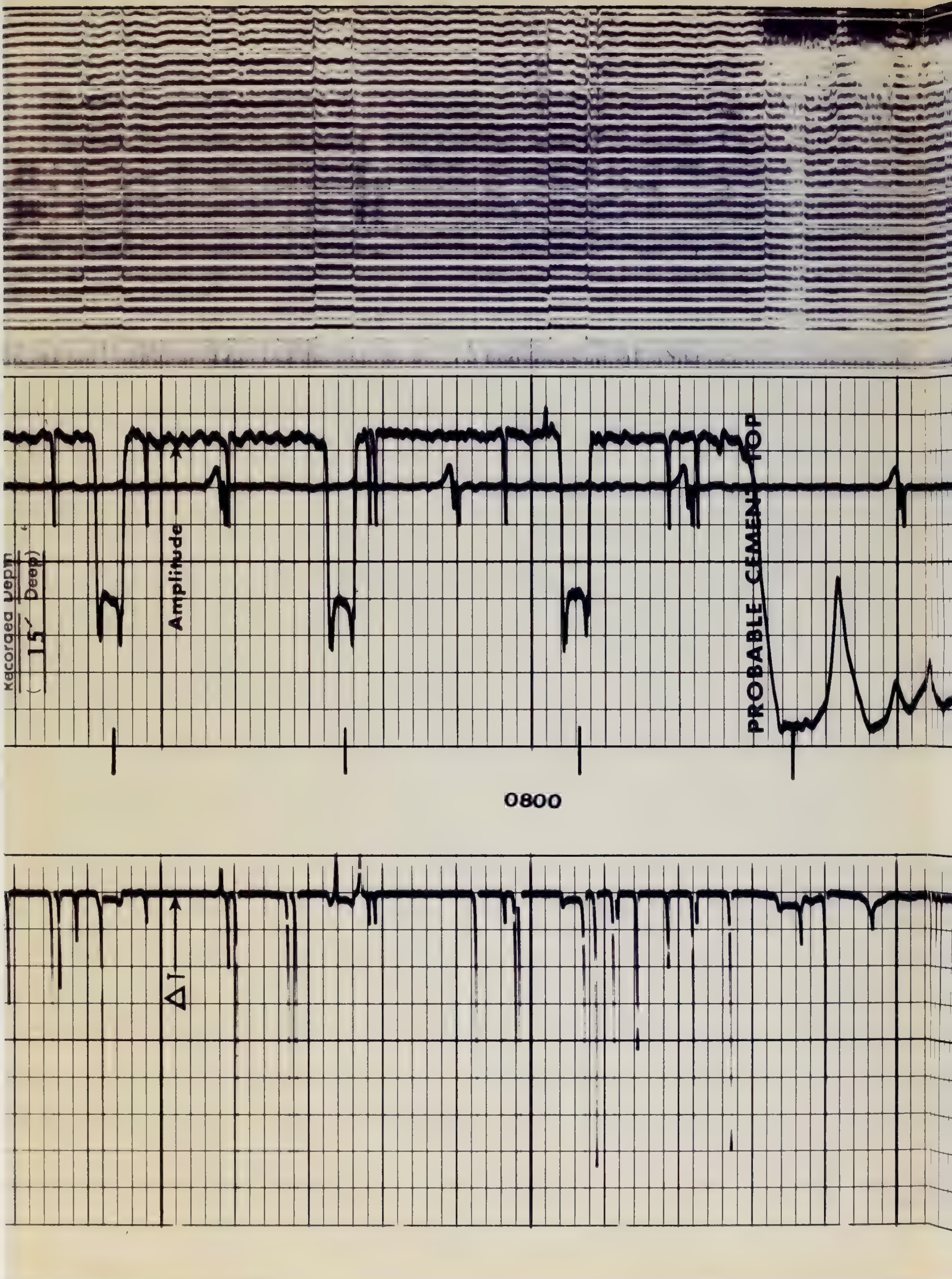
TRANSIT TIME
MICROSECONDS ____ SPACING
400 200

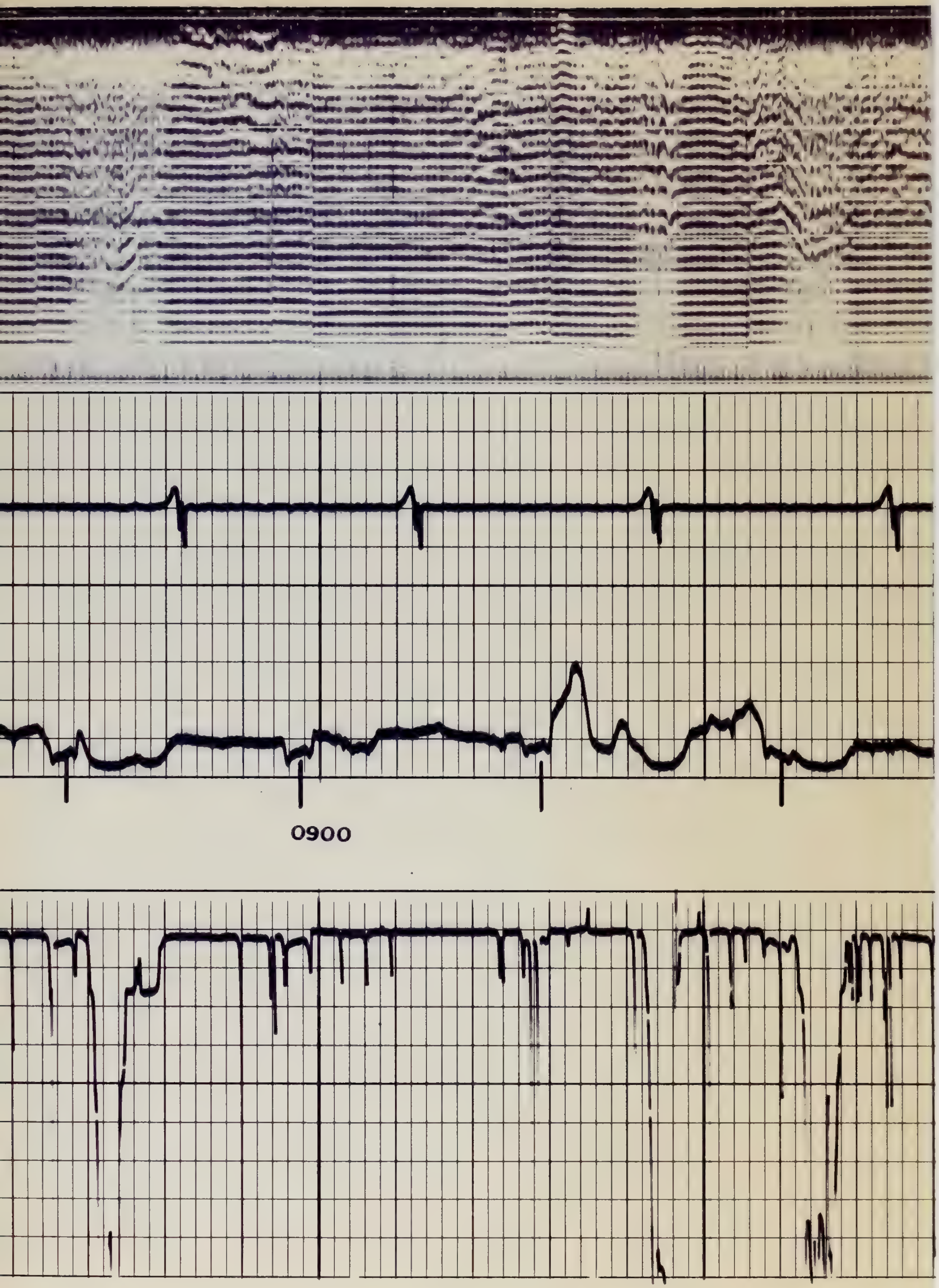
DEPTH

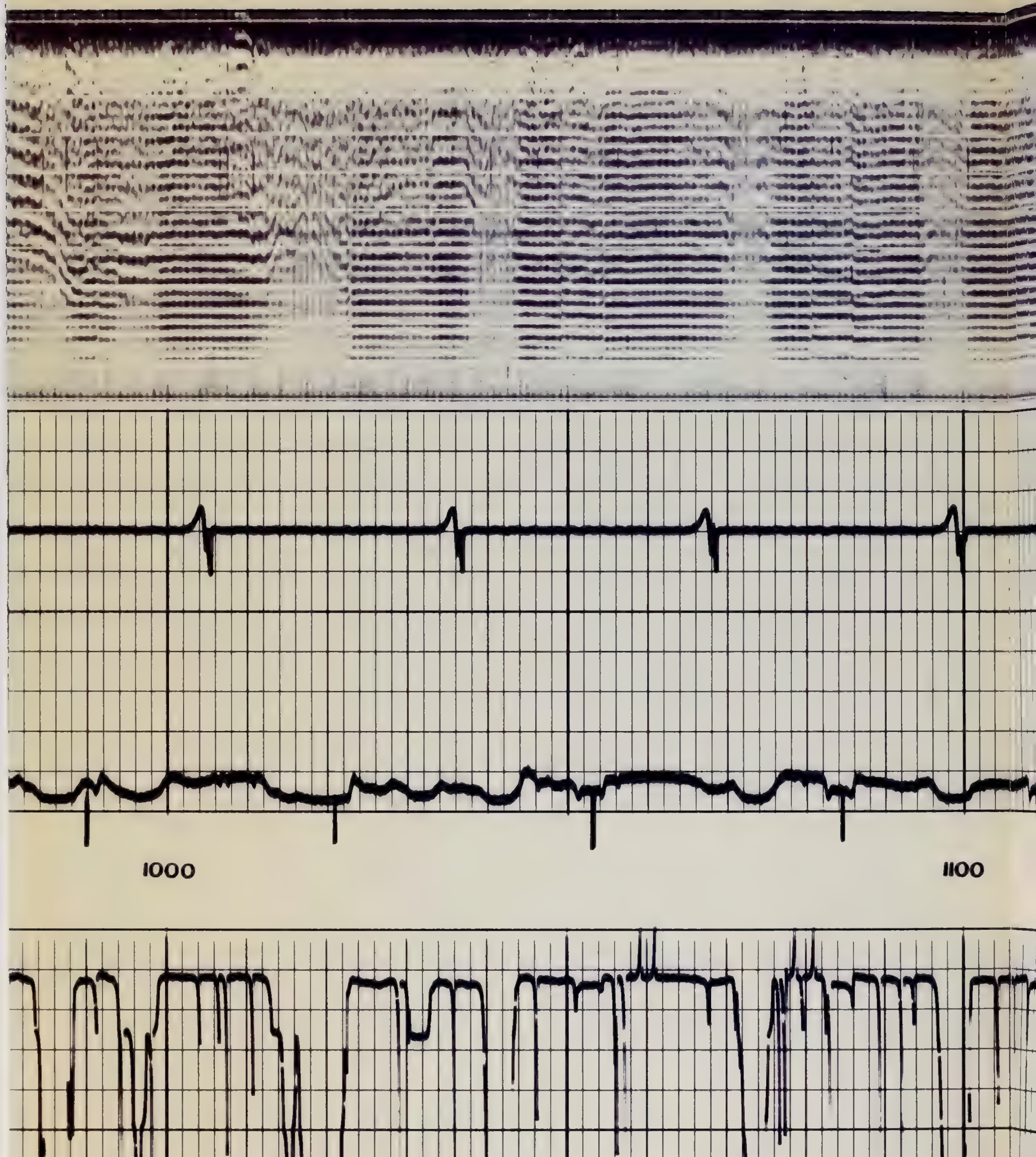
CASING BOND
MILLIVOLTS
0 100

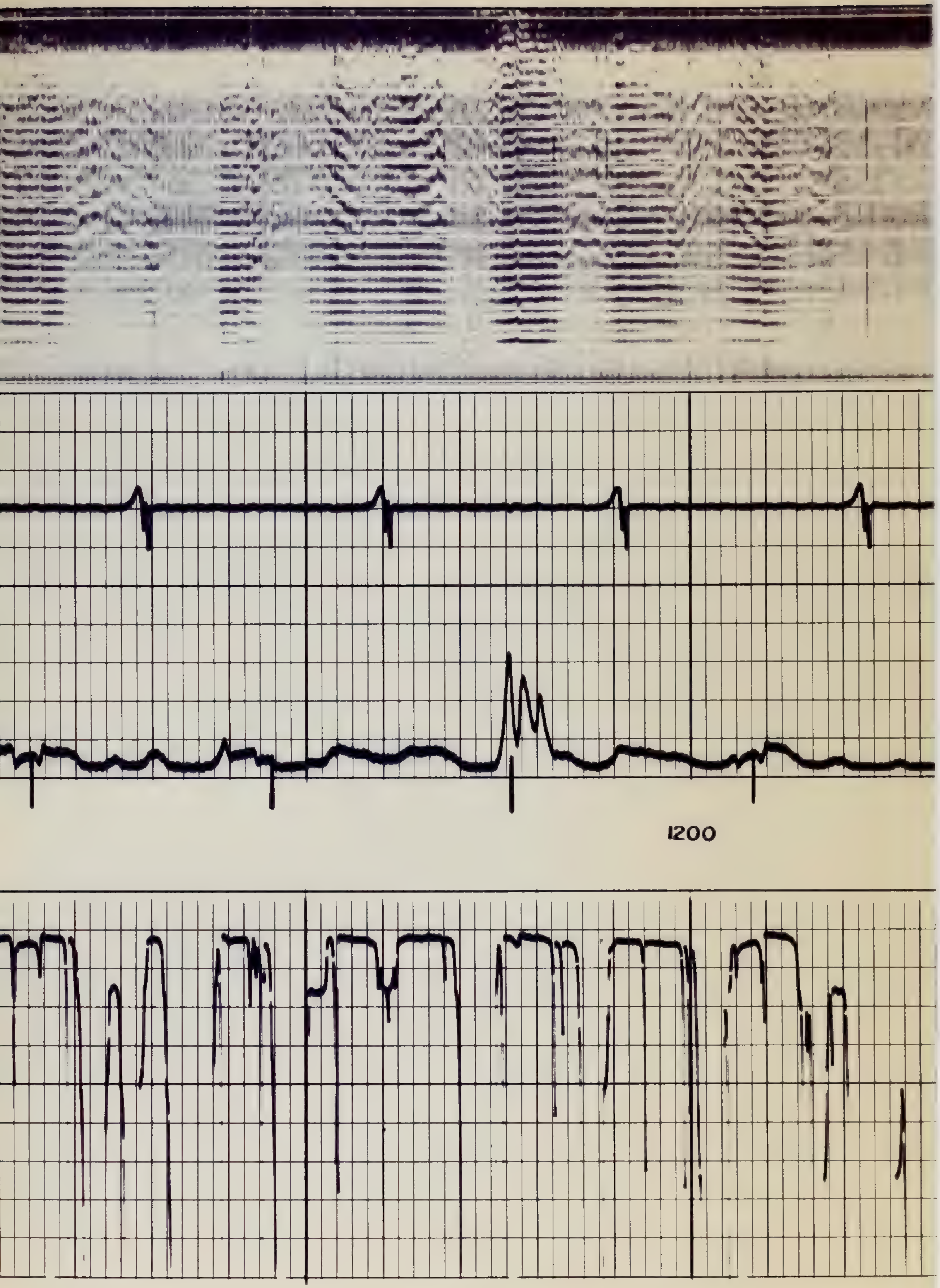
VARIABLE DENSITY
MICROSECONDS ____ SPACING

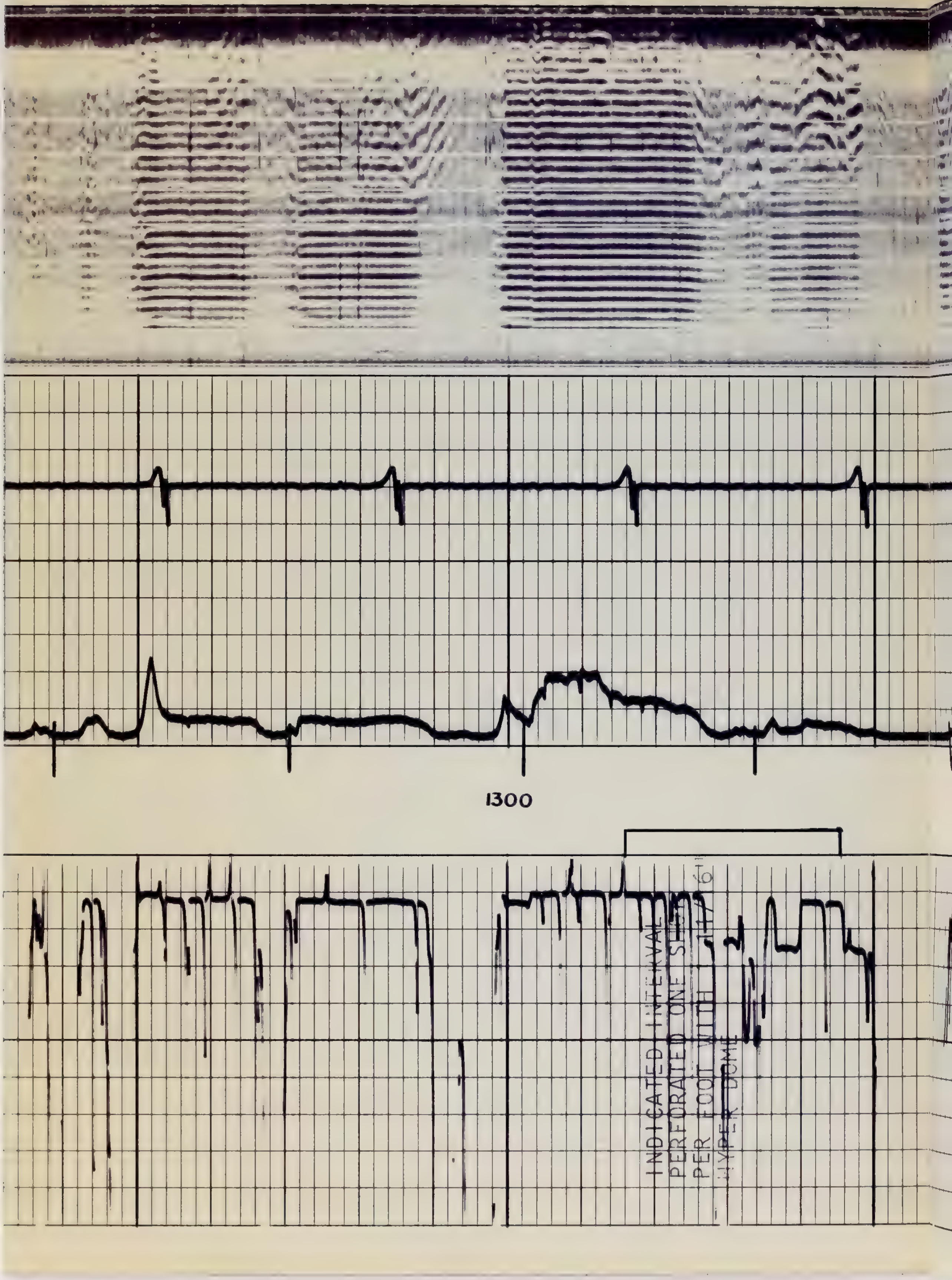

MICROSECONDS
SPACING
200
1200
0
100
MILLIVOLTS
Casing Collars
Corrected Depth
EPTH
MICROSECONDS
SPACING
400
200
NO. 1 LONG STRING
1
3
2
1
0700
1
4
3
2
1
Casing Collars
Correct Depth
Casing Collars
CUT

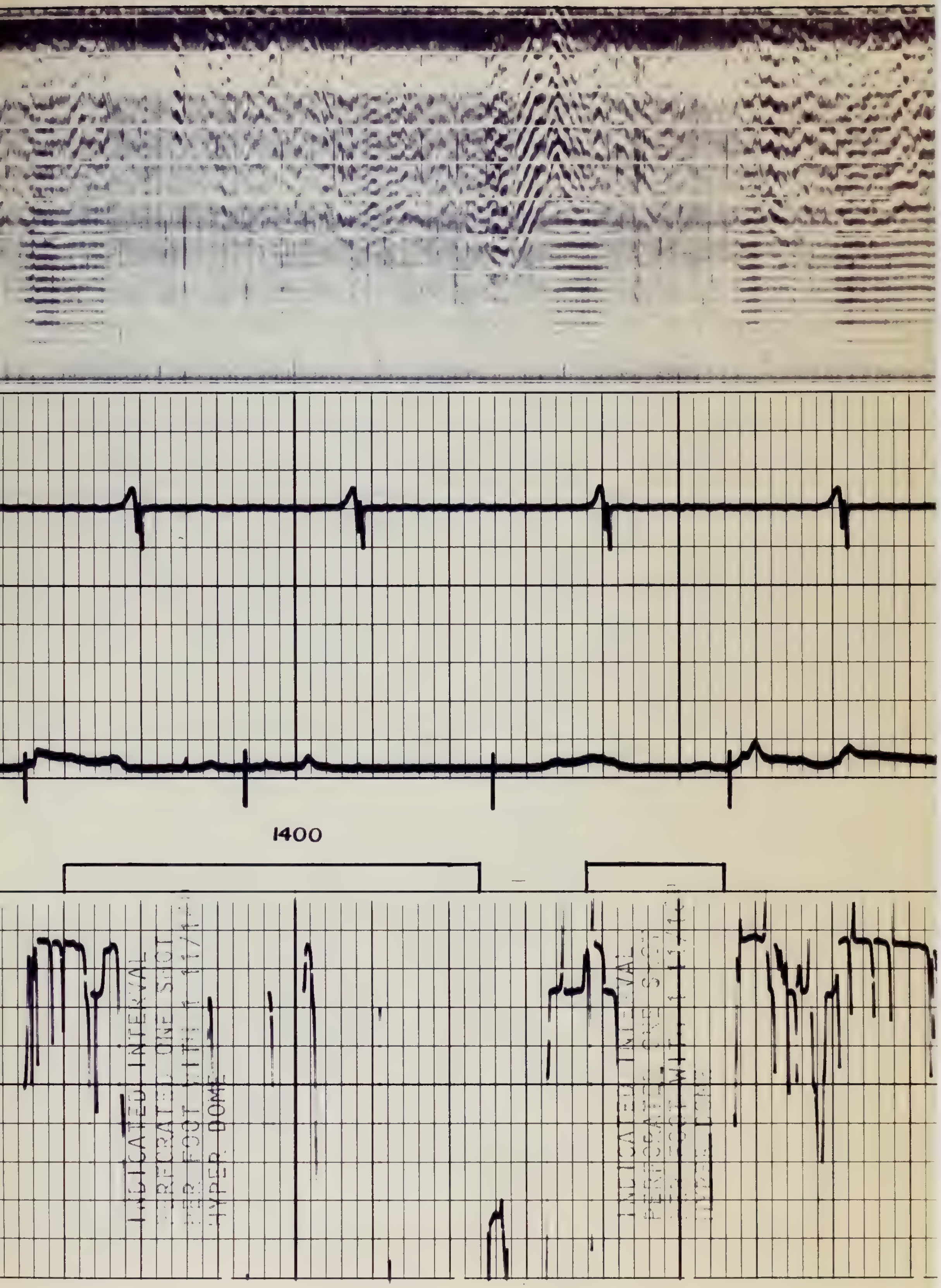

Recorded Depth
(15' Deep)
Amplitude
PROBABLE CEMENT TOP
0800
ΔT


0900


1000
1100


1200


1300
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH 11/16"
HYPER DOME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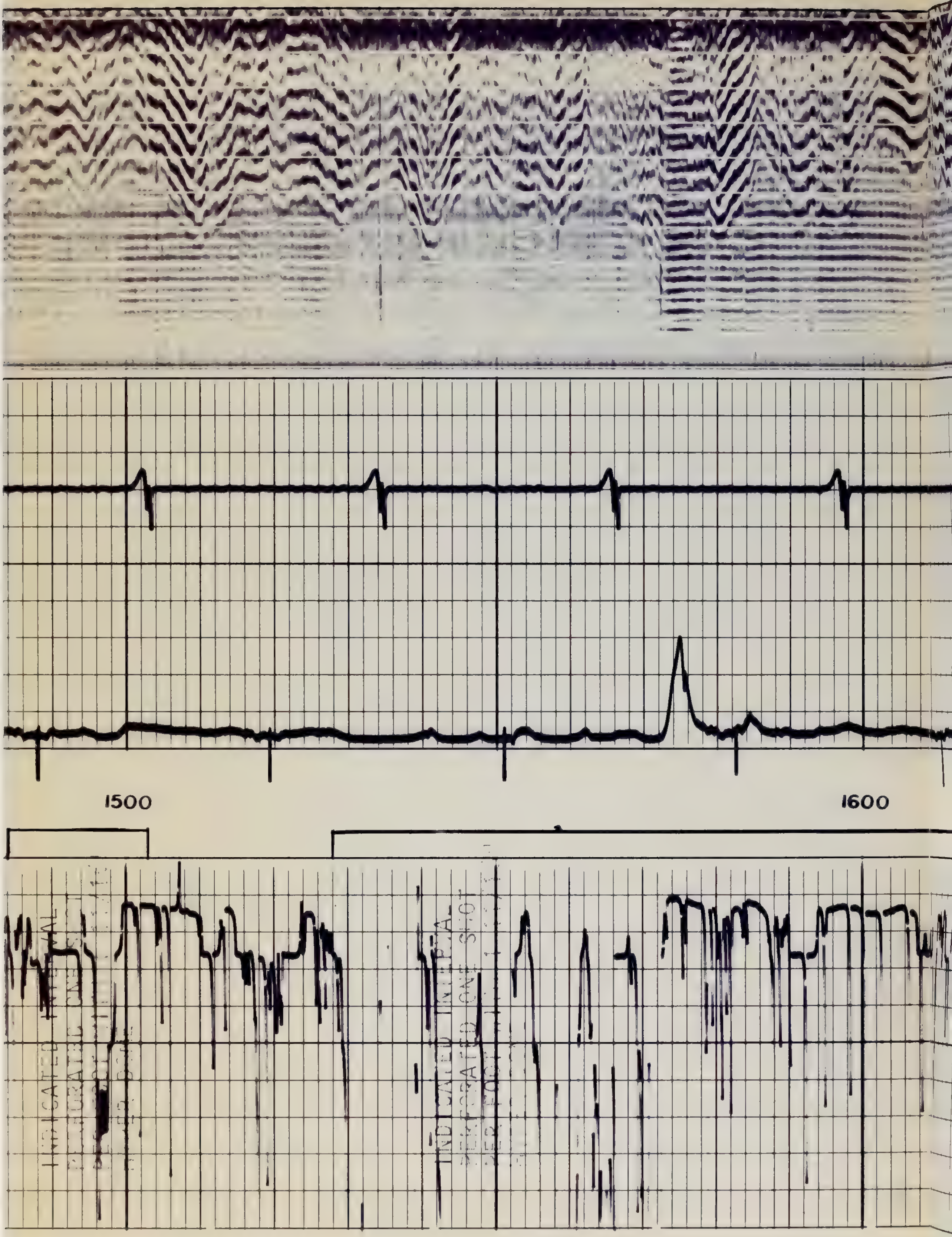
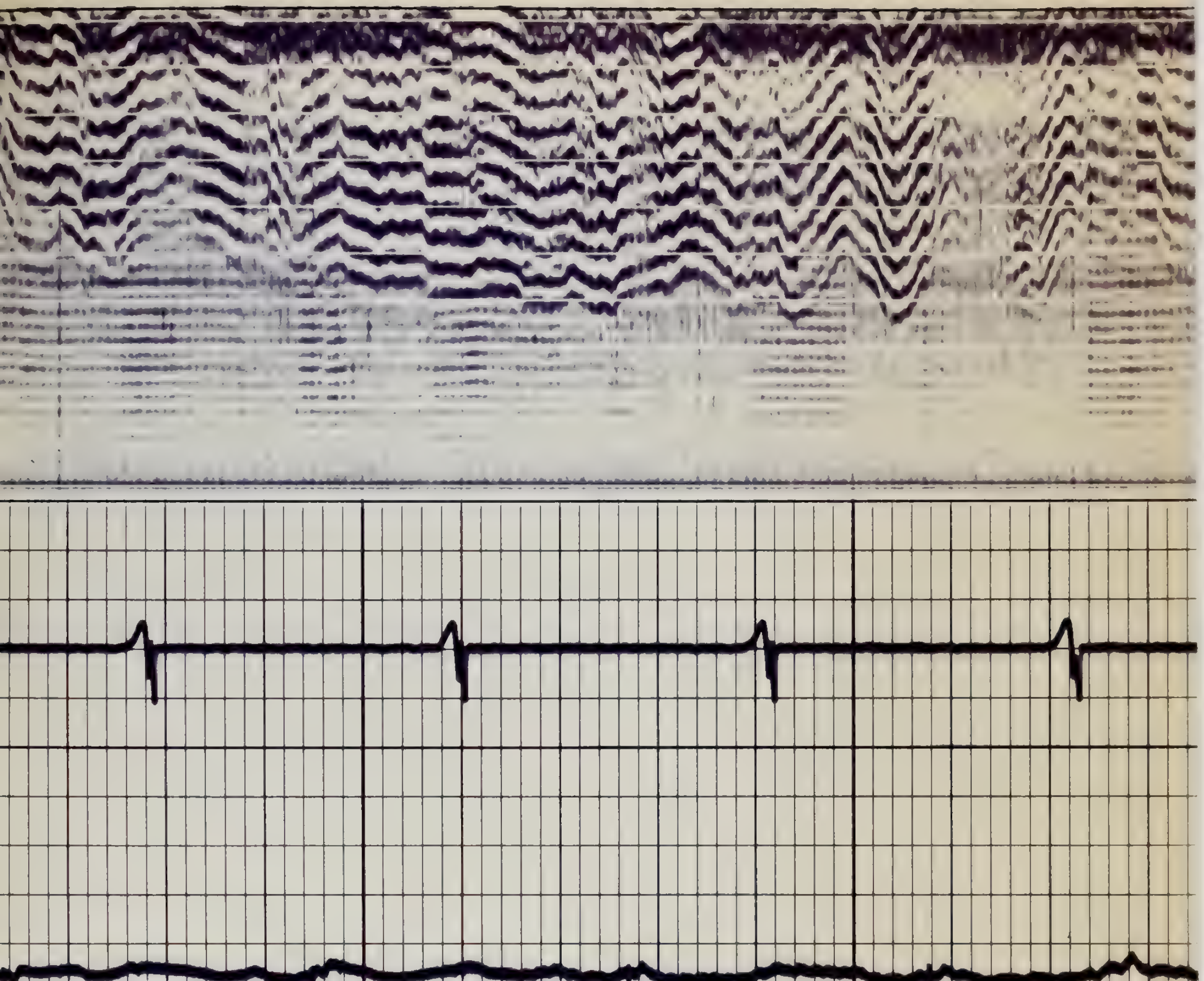
INDICATED INTERVAL PERFORATED ONE SHOT PER FOOT WITH 1 11/16 HYPER DOME
INDICATED INTERVAL PERFORATED ONE SHOT PER FOOT WITH 1 11/16 HYPER DOME


1500
1600
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT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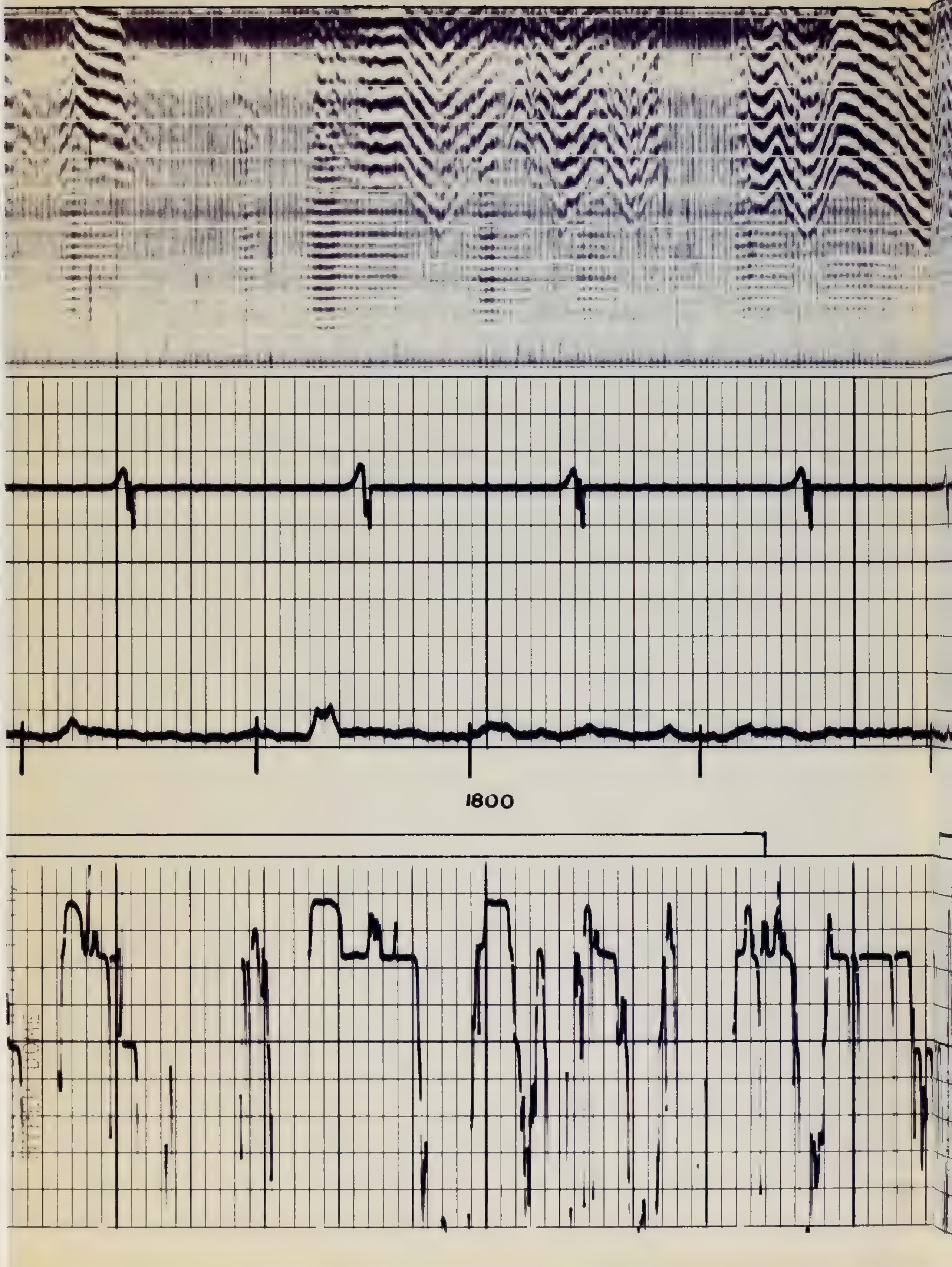
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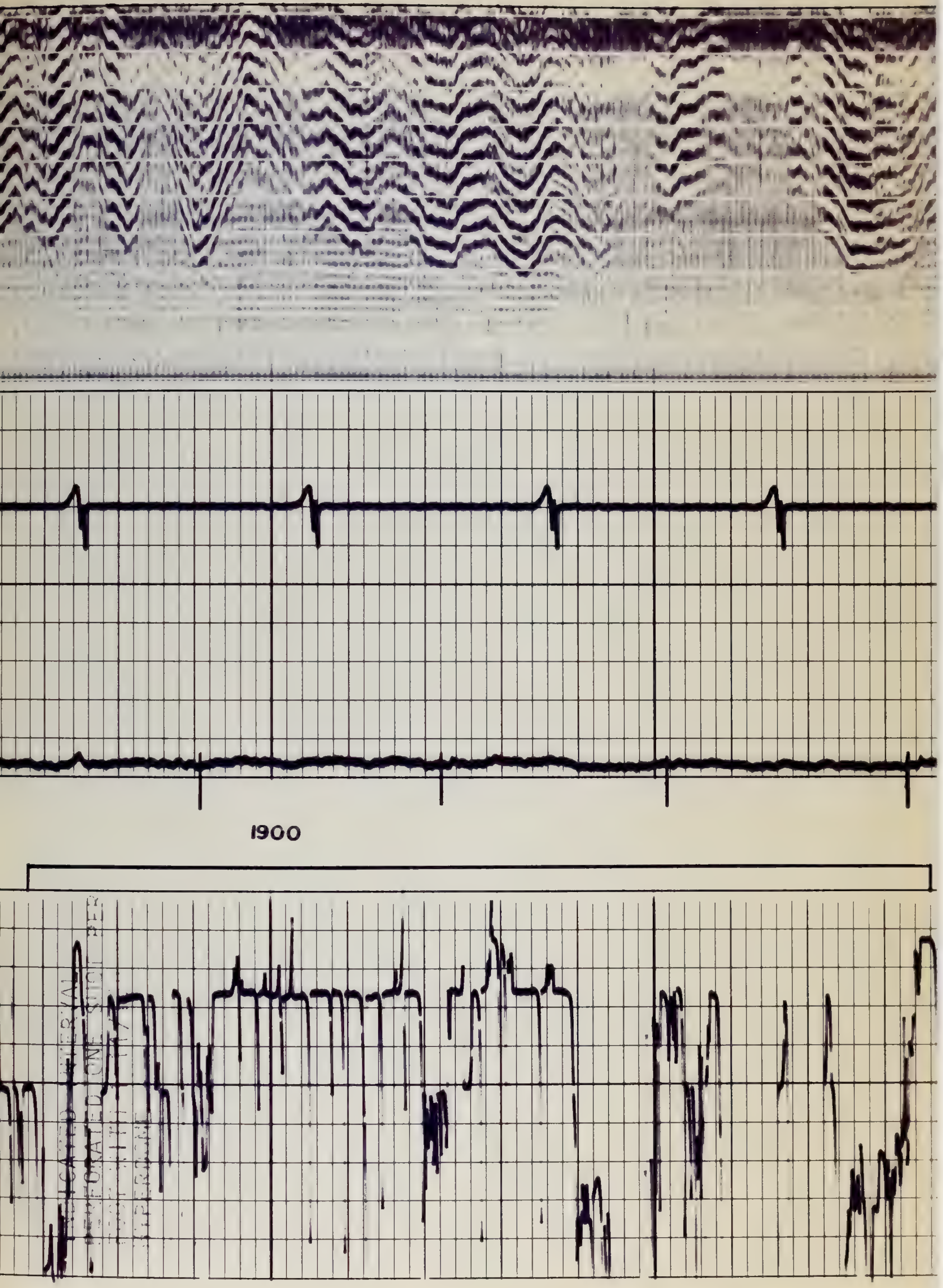
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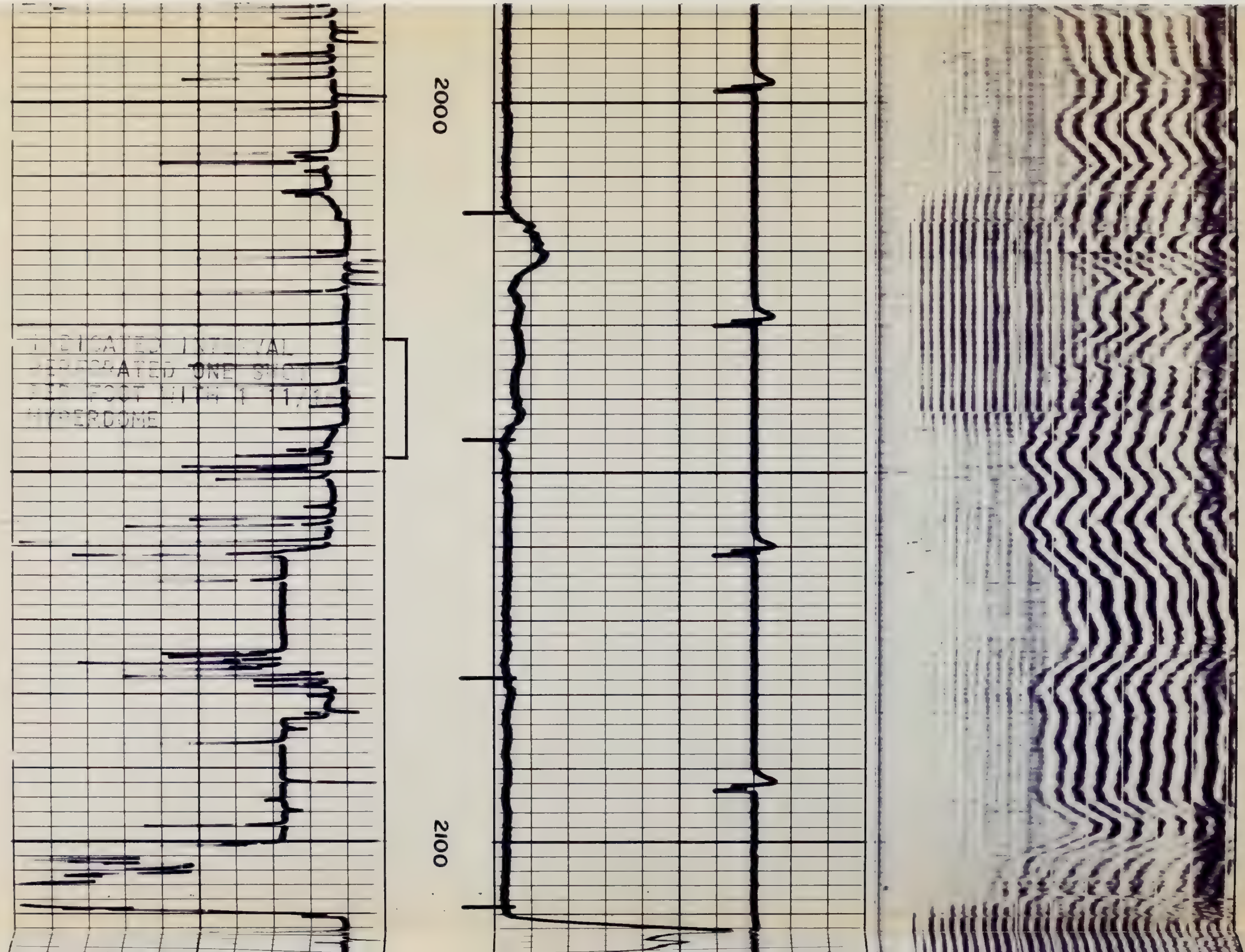
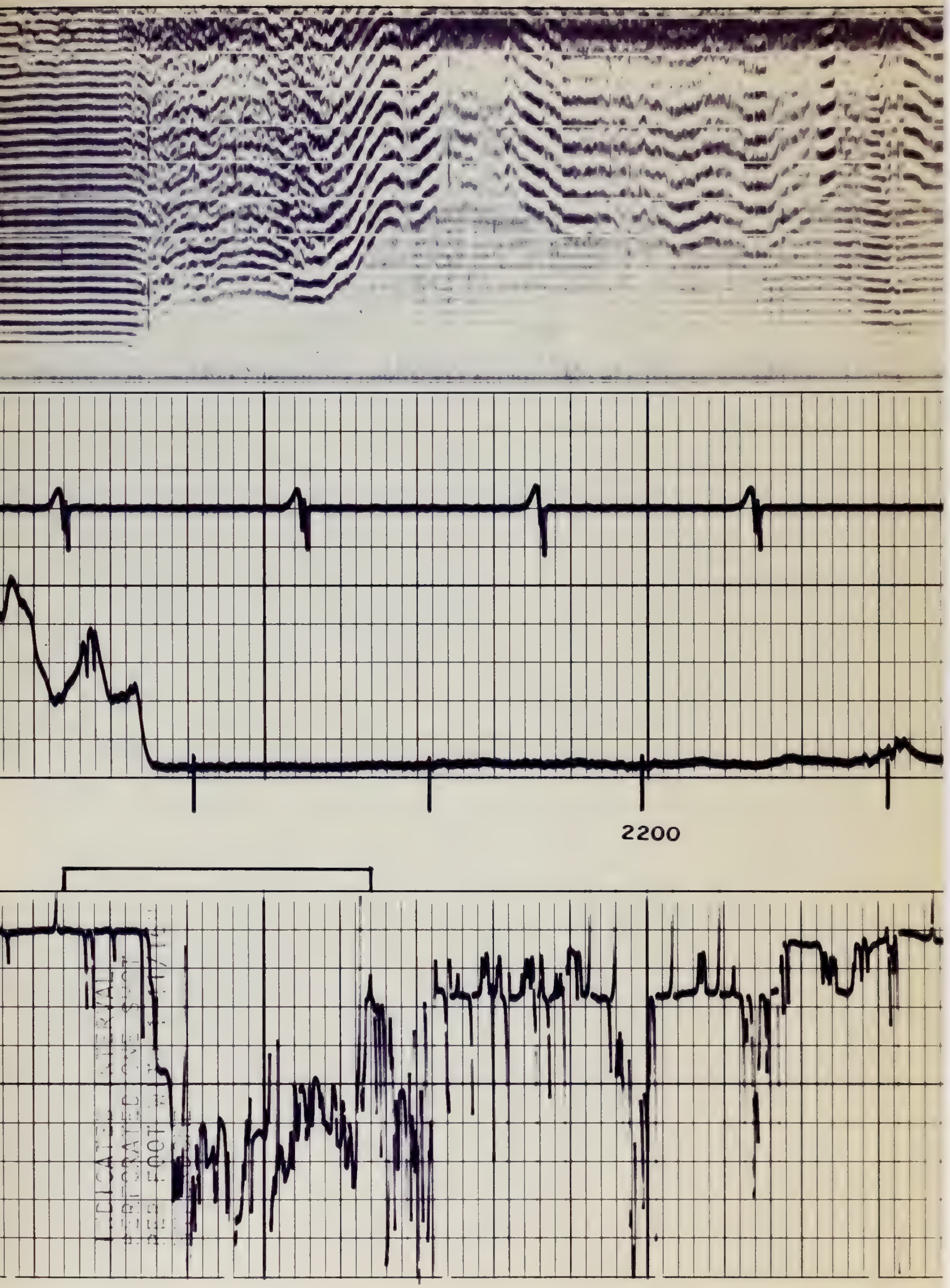


INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH 1 11/16"
HYPERDOME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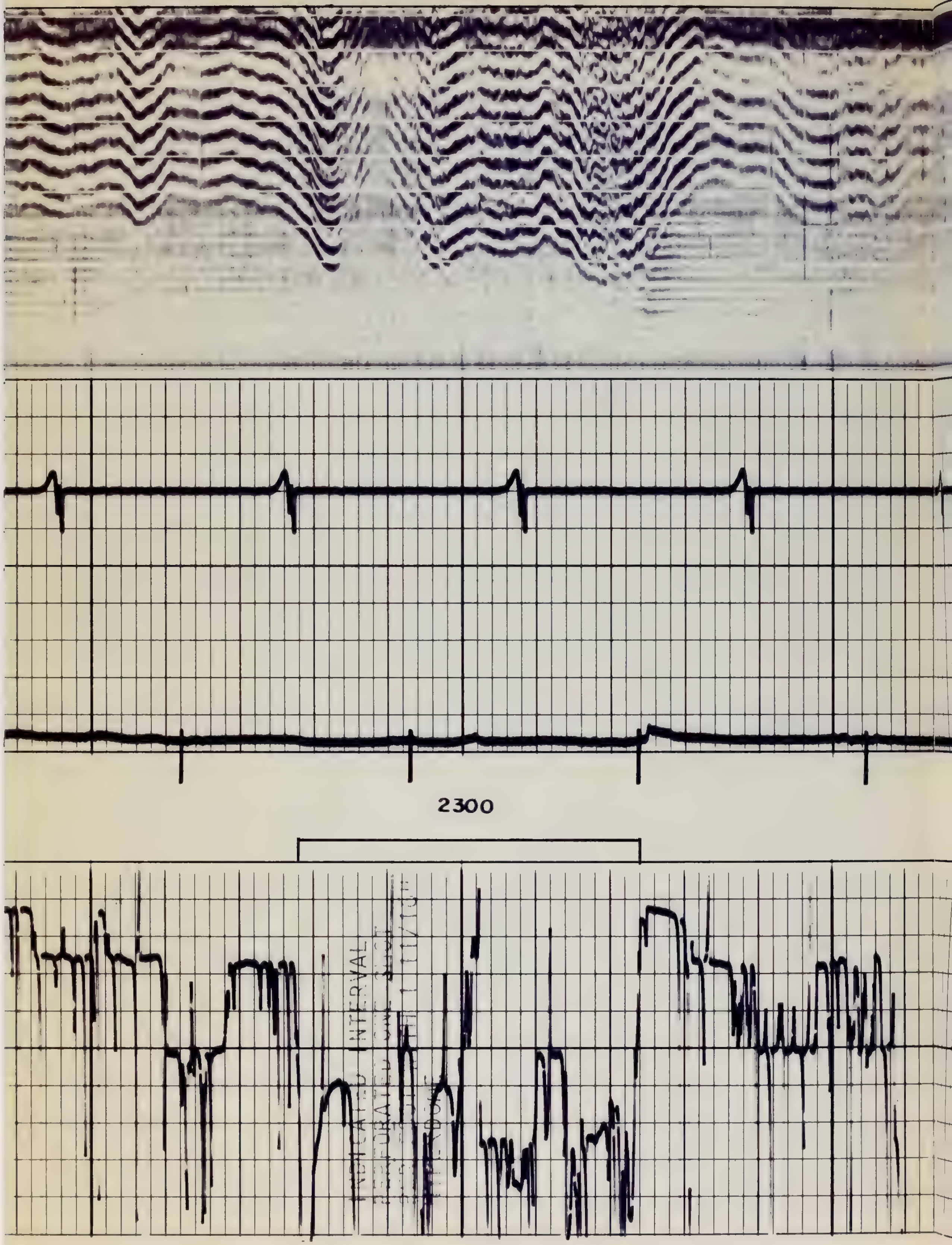
INDICATES INTERVAL
PERFORATED ONE SHOT
PER FOOT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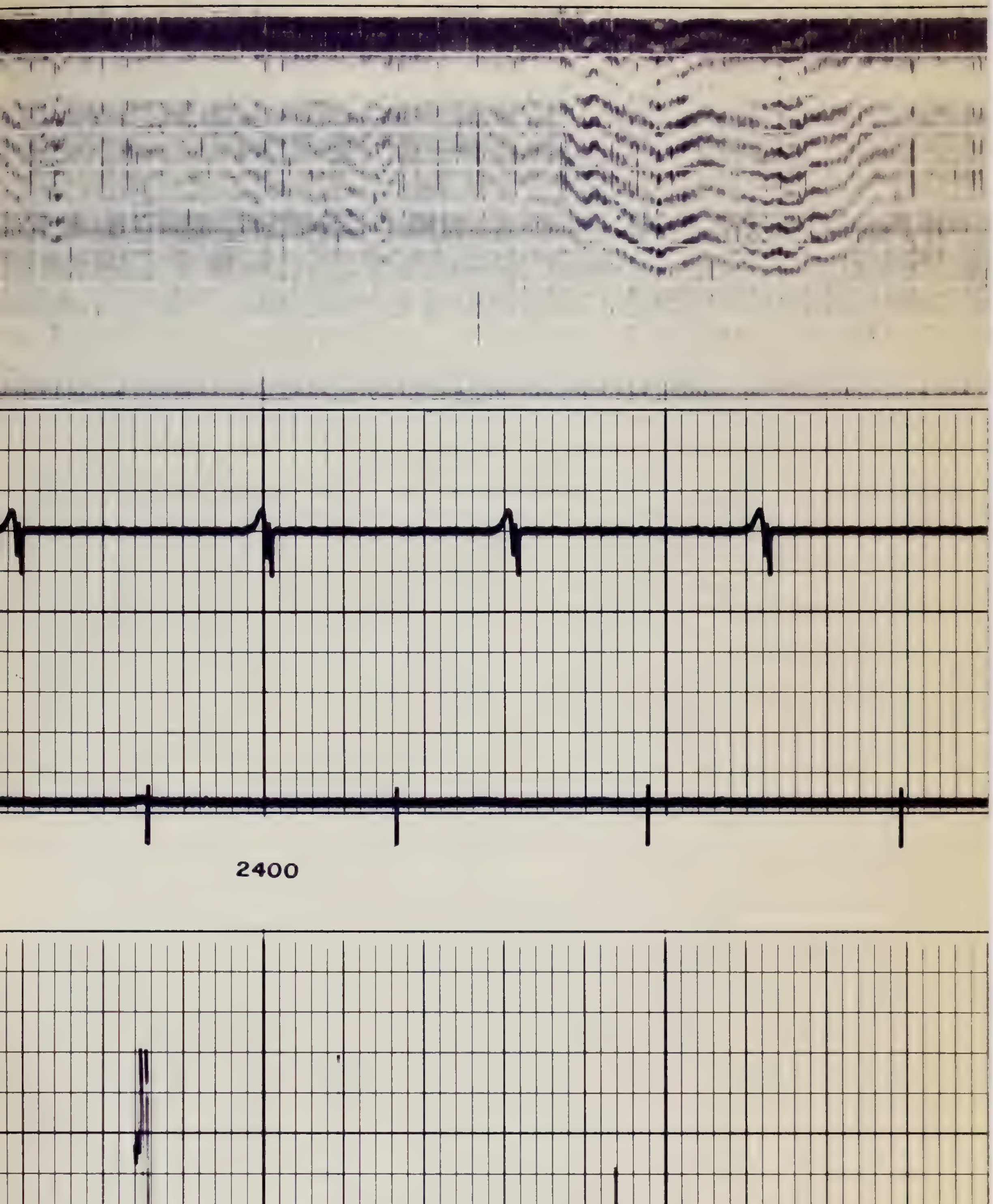
INDICATED INTERVAL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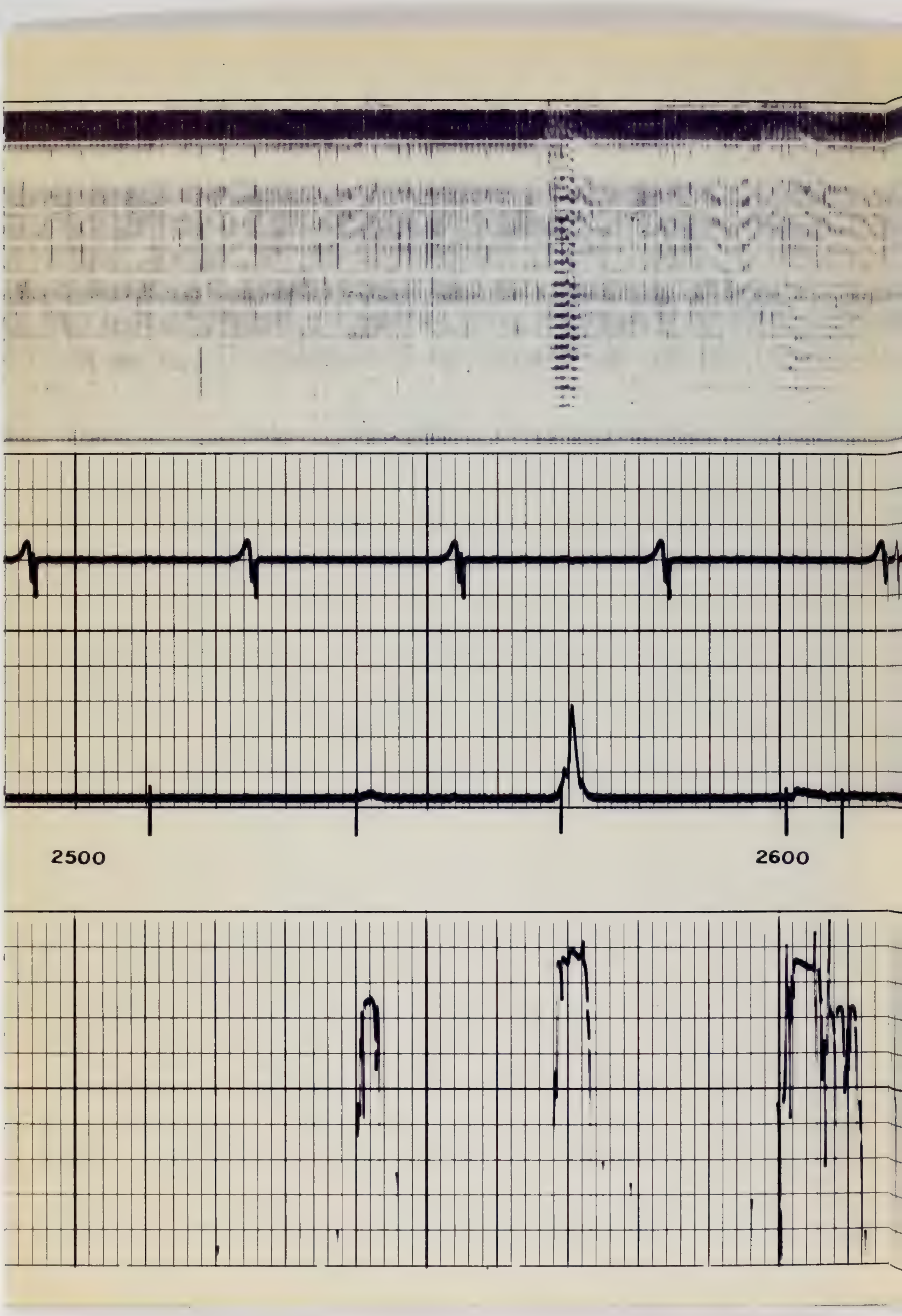
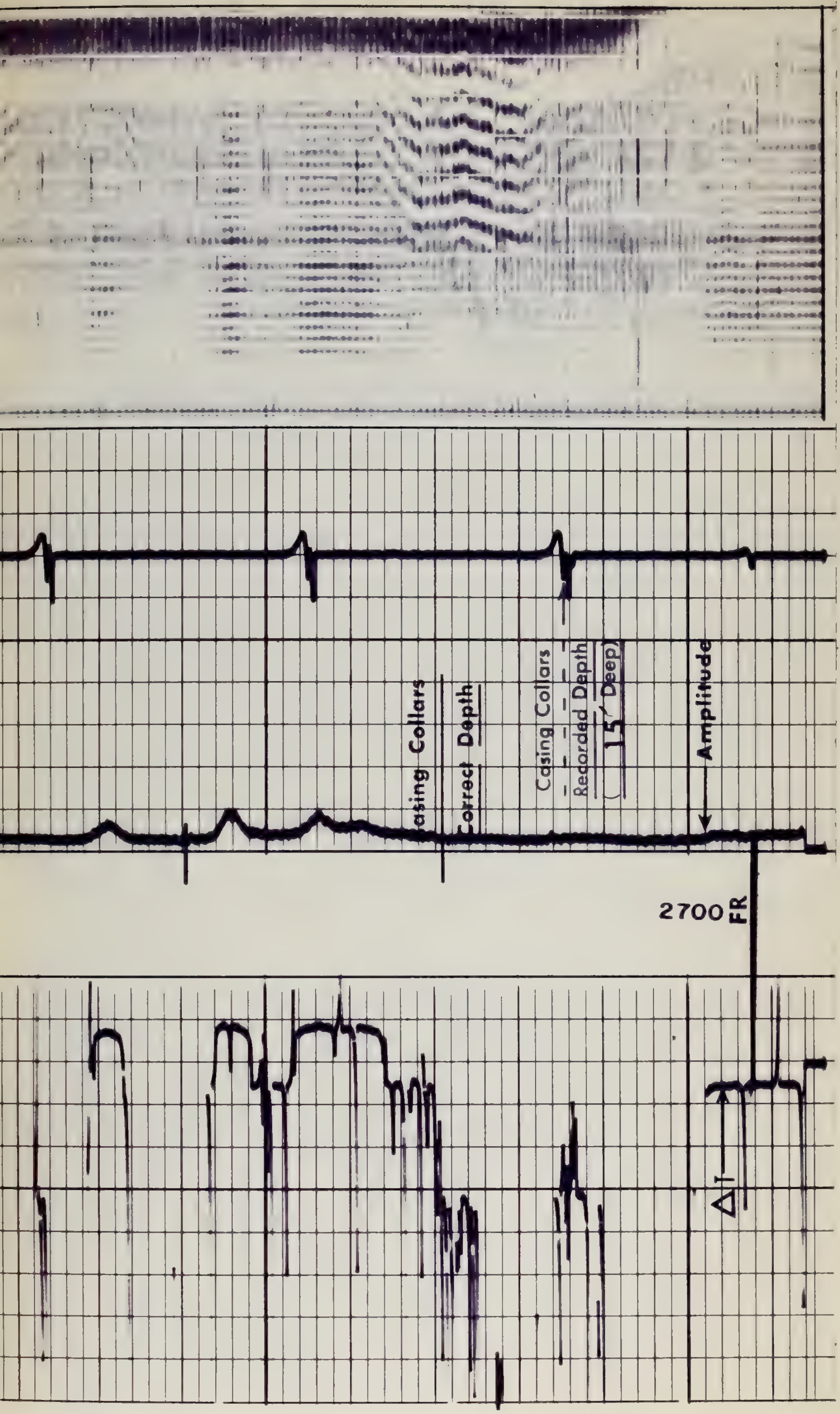
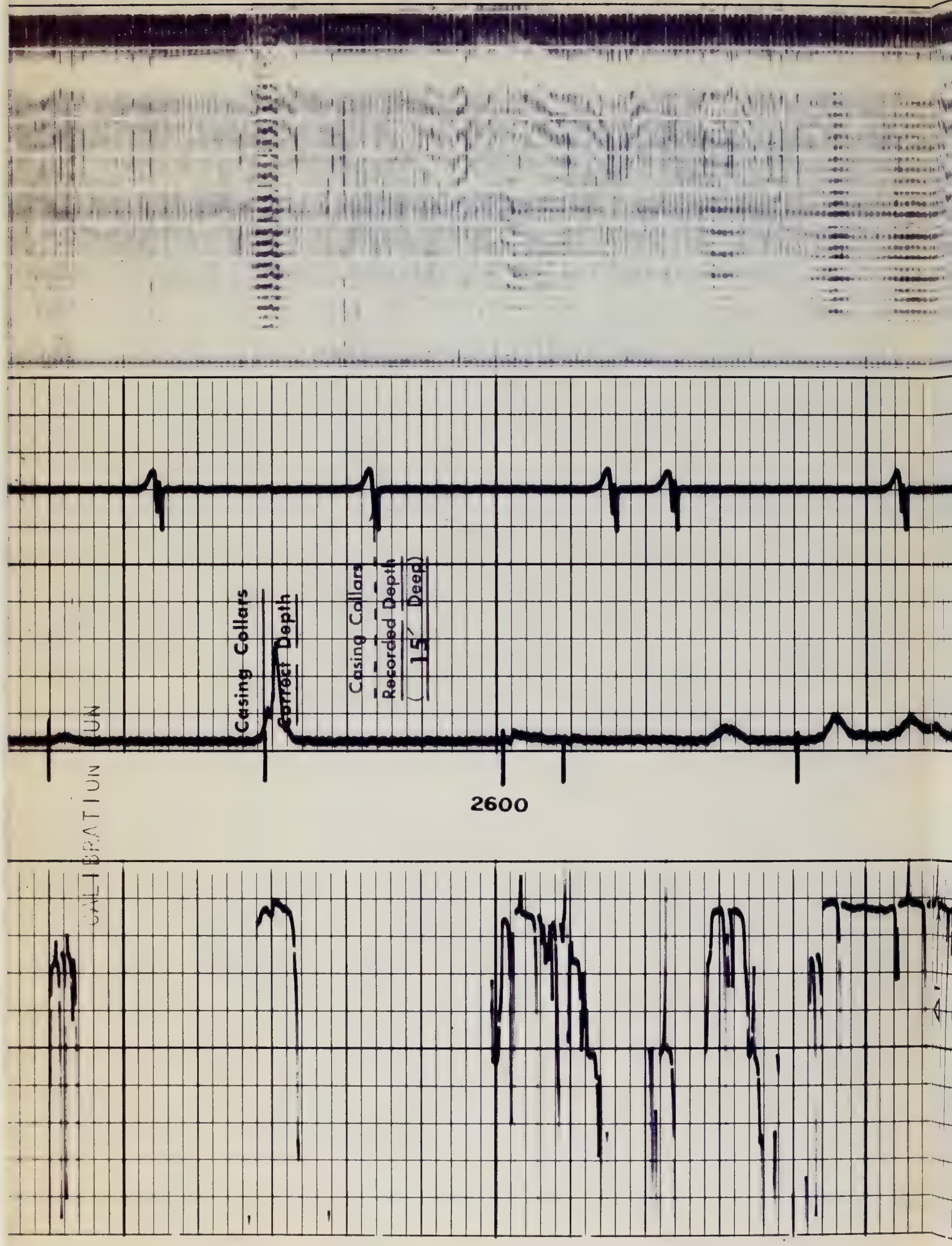
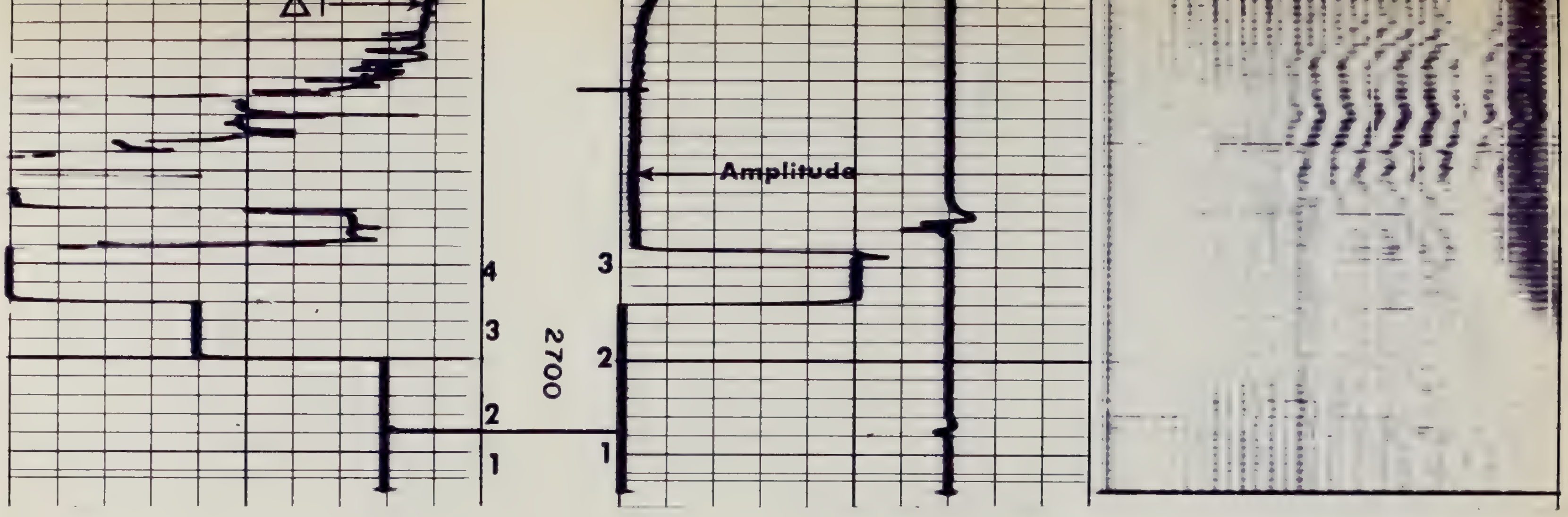
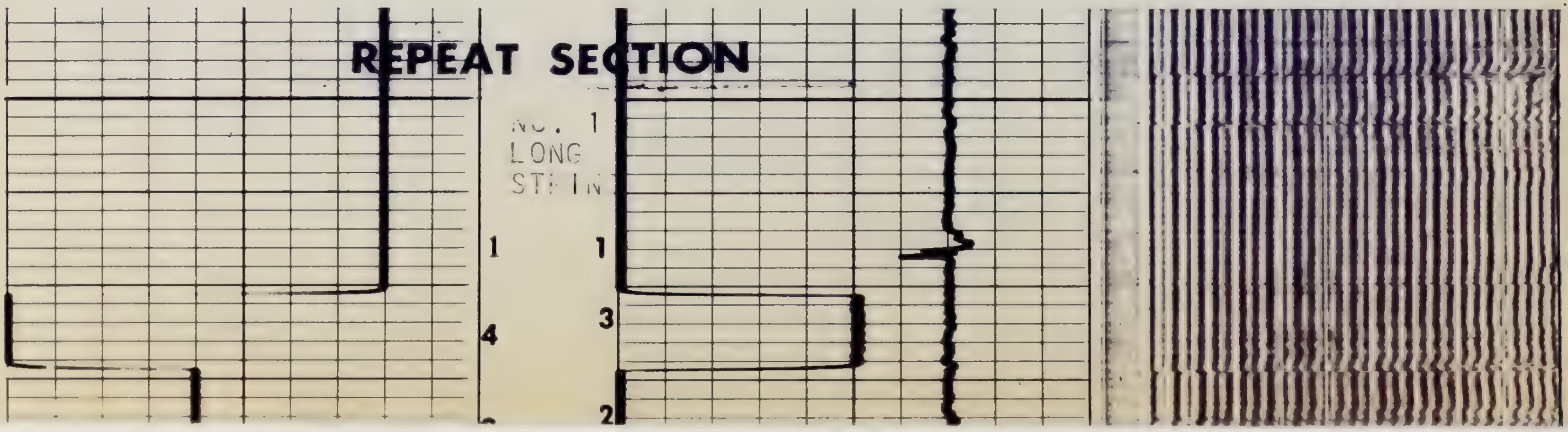
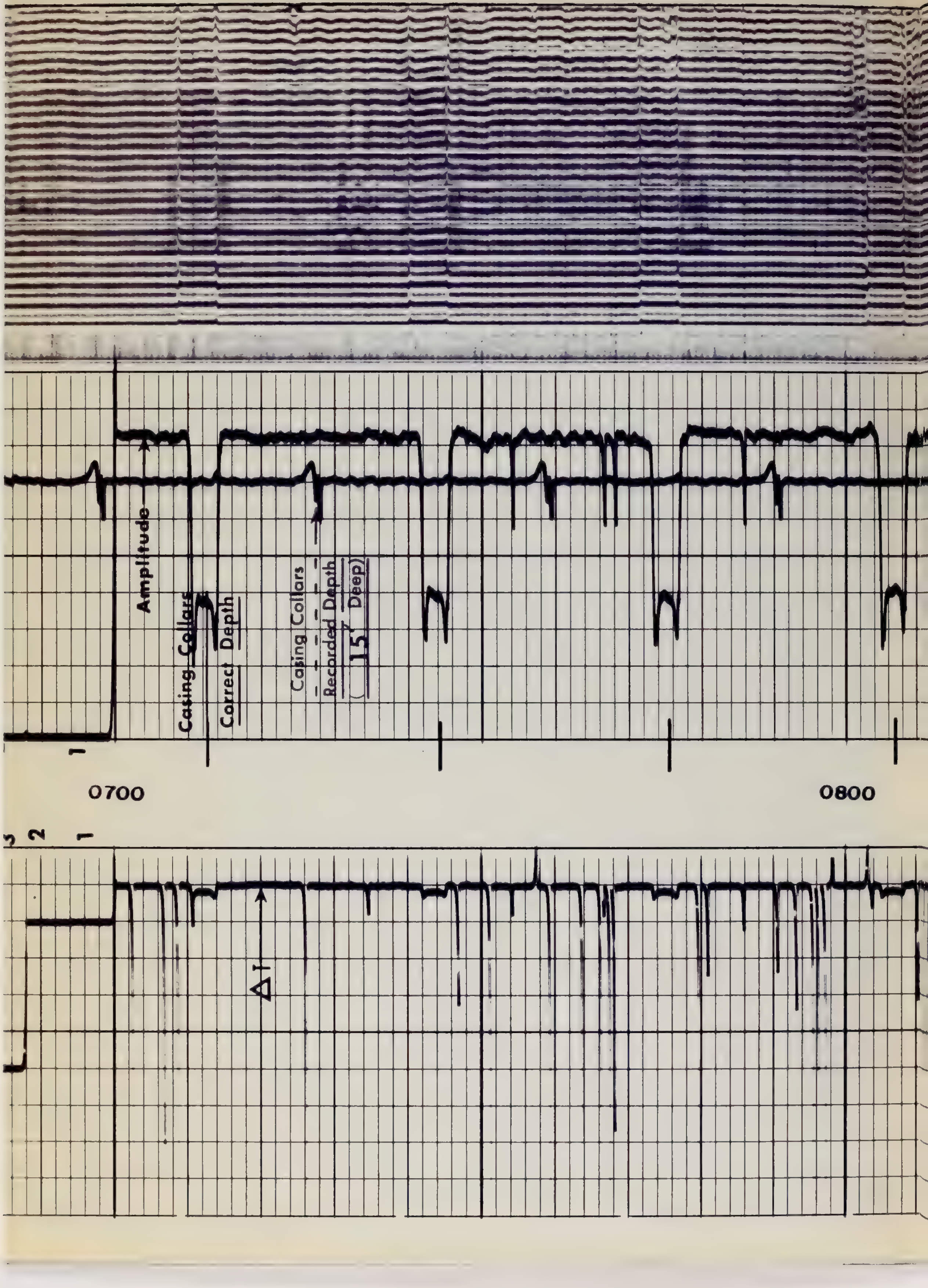

2500
2600

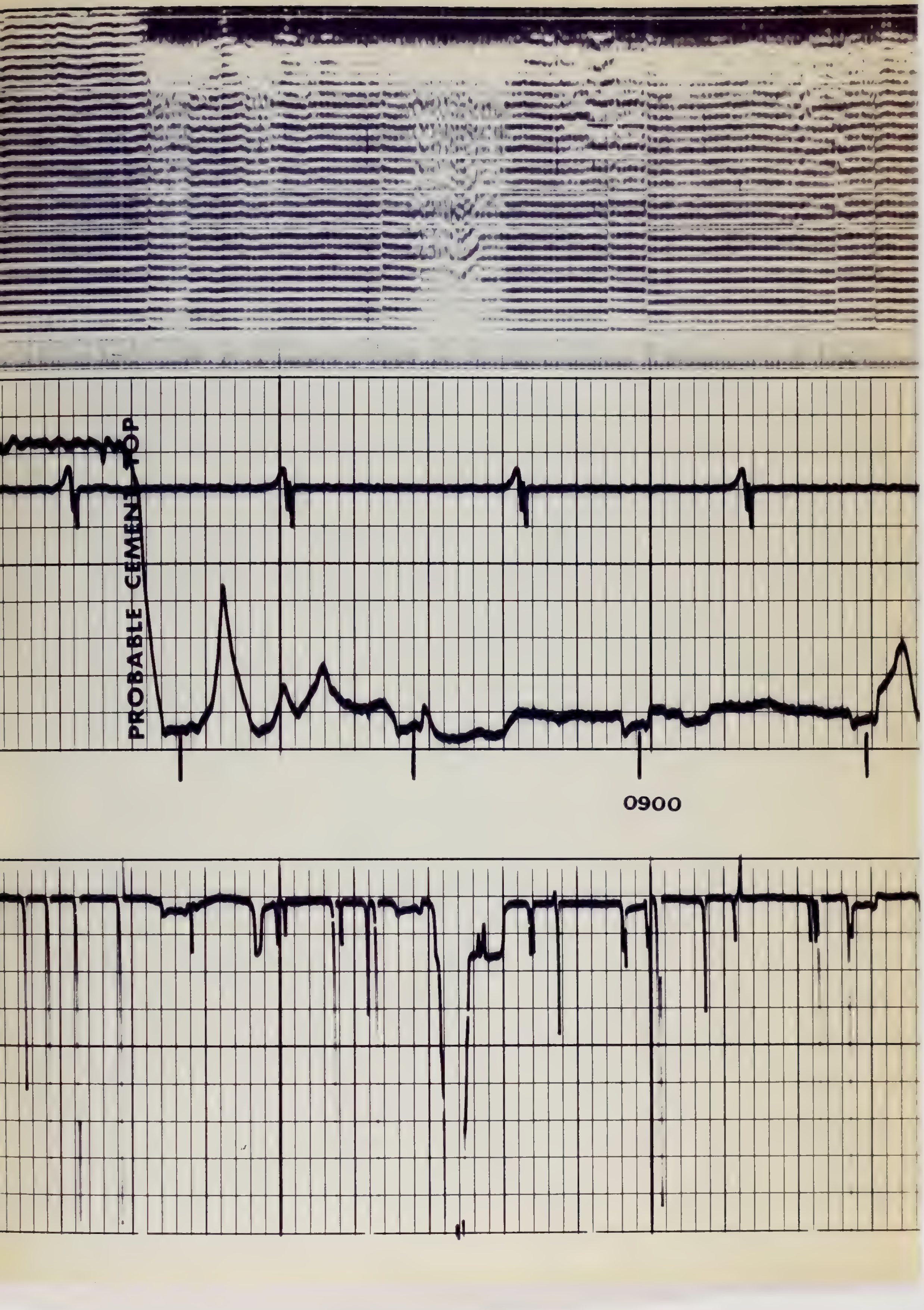

asing Collars
orrect Depth
Casing Collars
Recorded Depth
(15' Deep)
Amplitude
2700 FR
ΔT

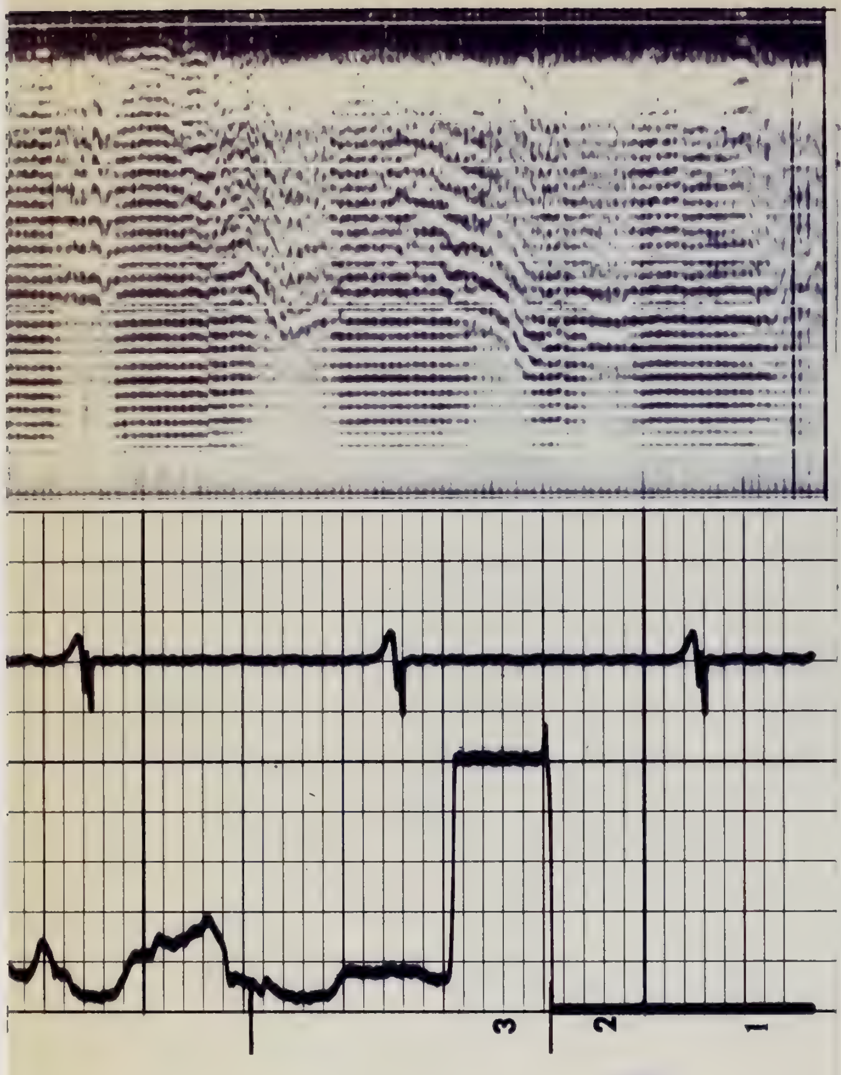

CALIBRATION RUN
Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(15' Deep)
2600

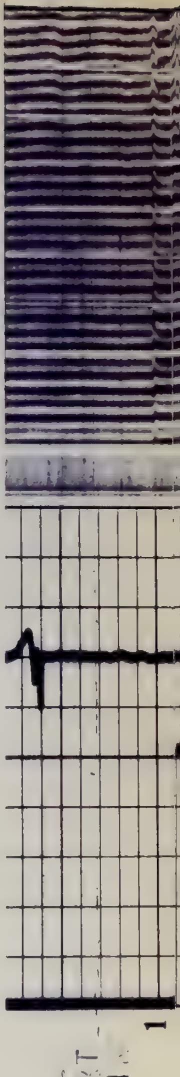

Amplitude
4
3
2
1
2700
3
2
1

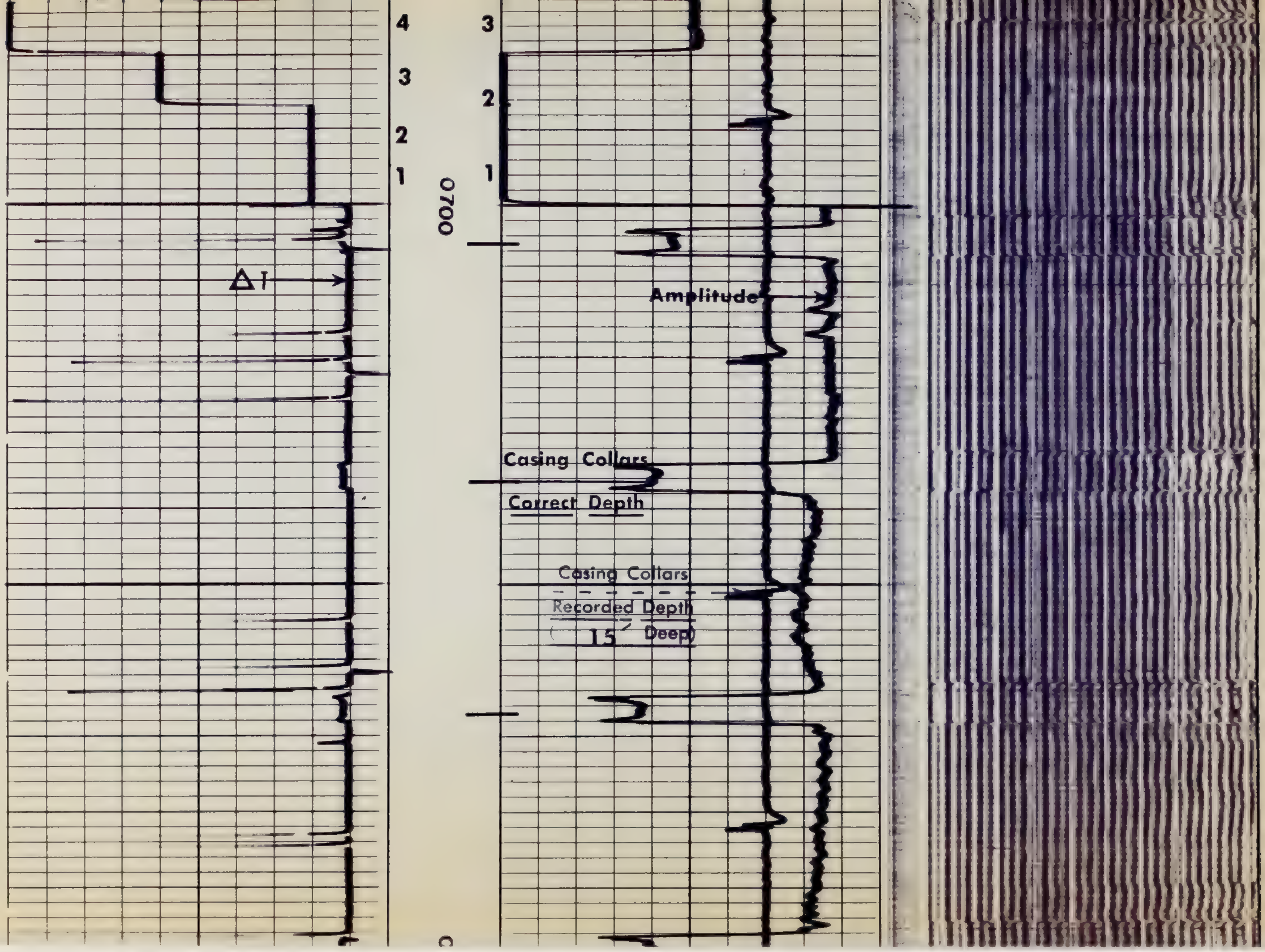

REPEAT SECTION
NO. 1
LONG
STRING
1
4
1
3
2

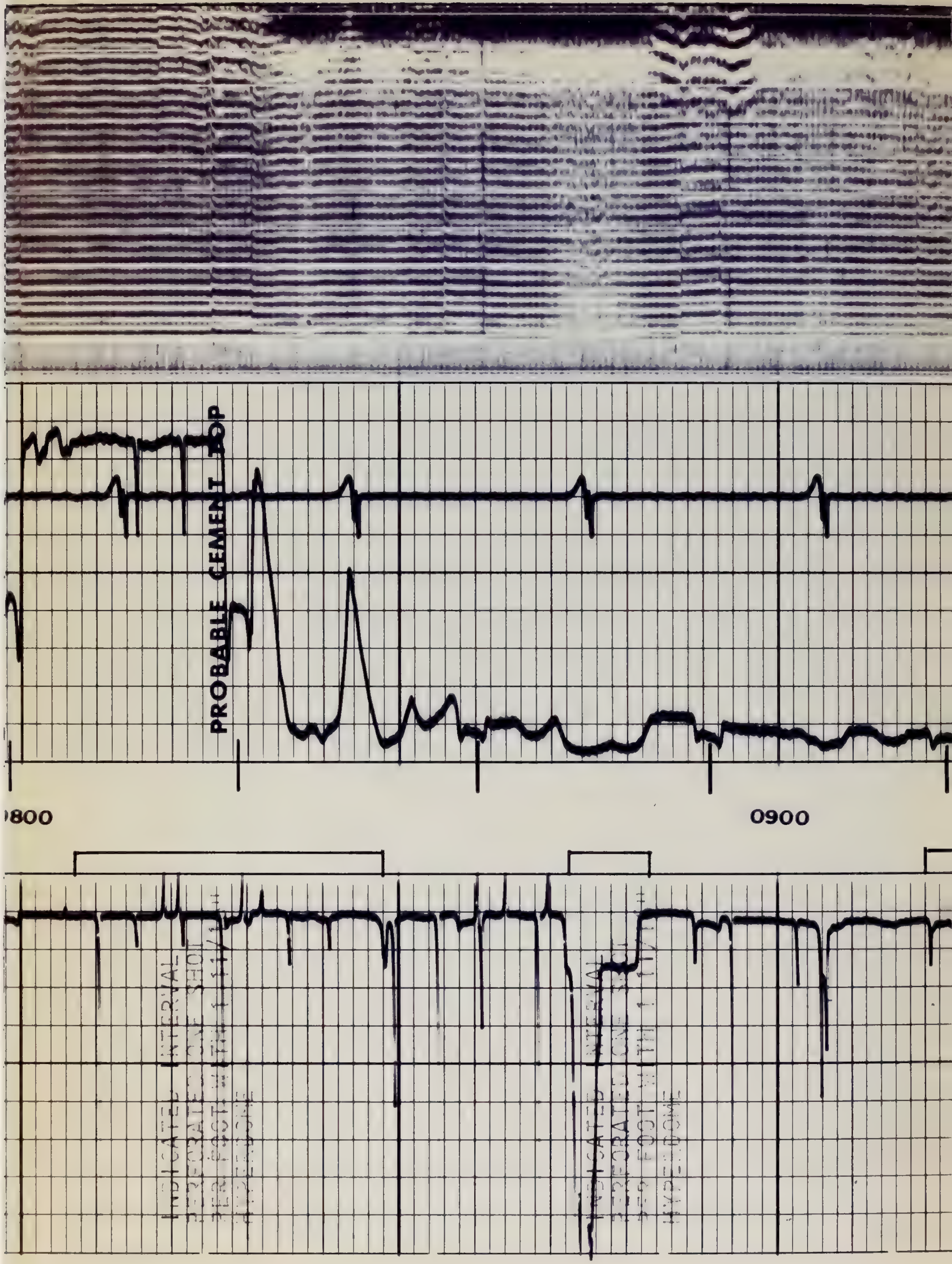

Amplitude
Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(15' Deep)
1
0700
0800
3 2 1
ΔT

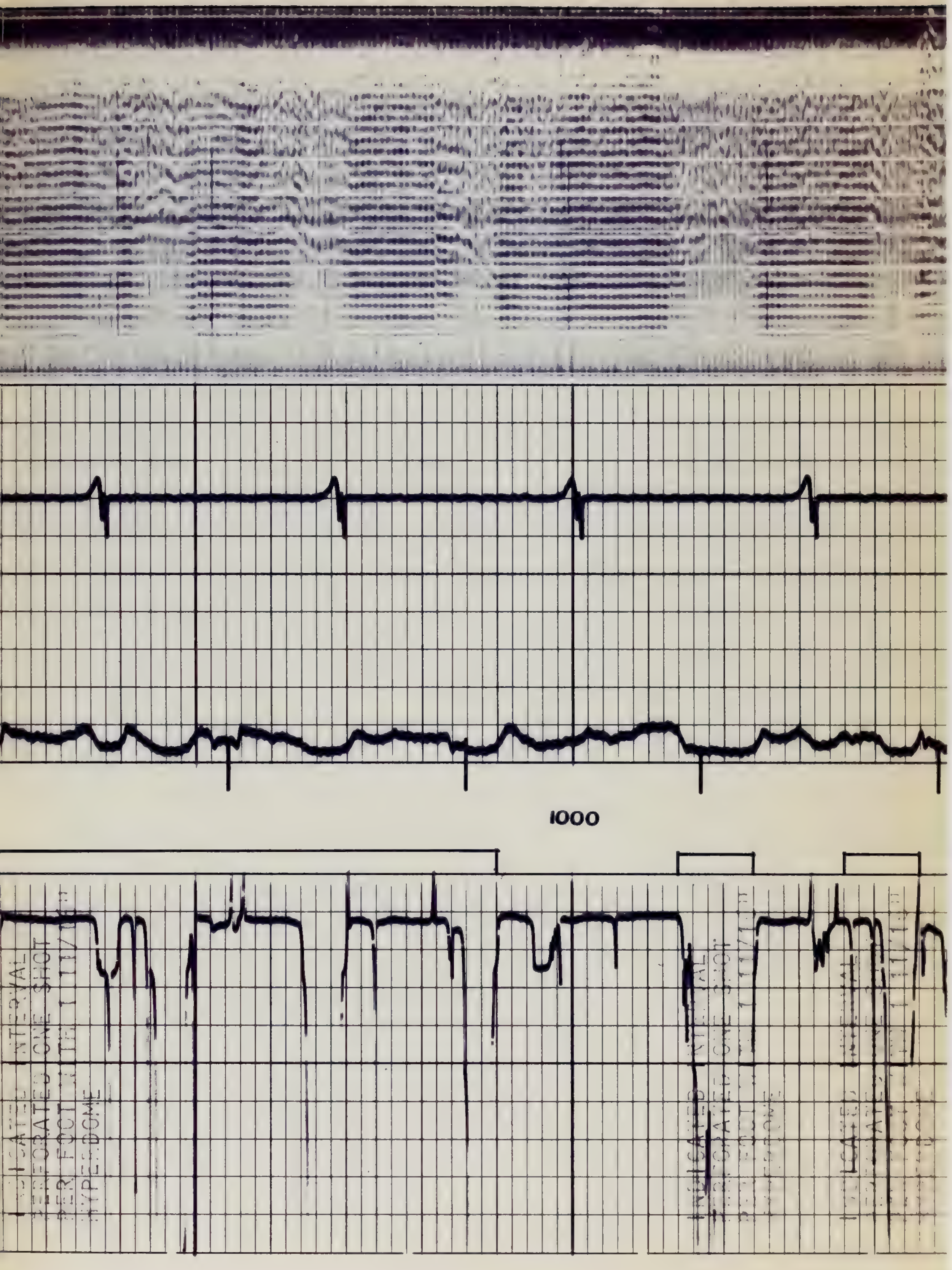

PROBABLE CEMENT TOP
0900

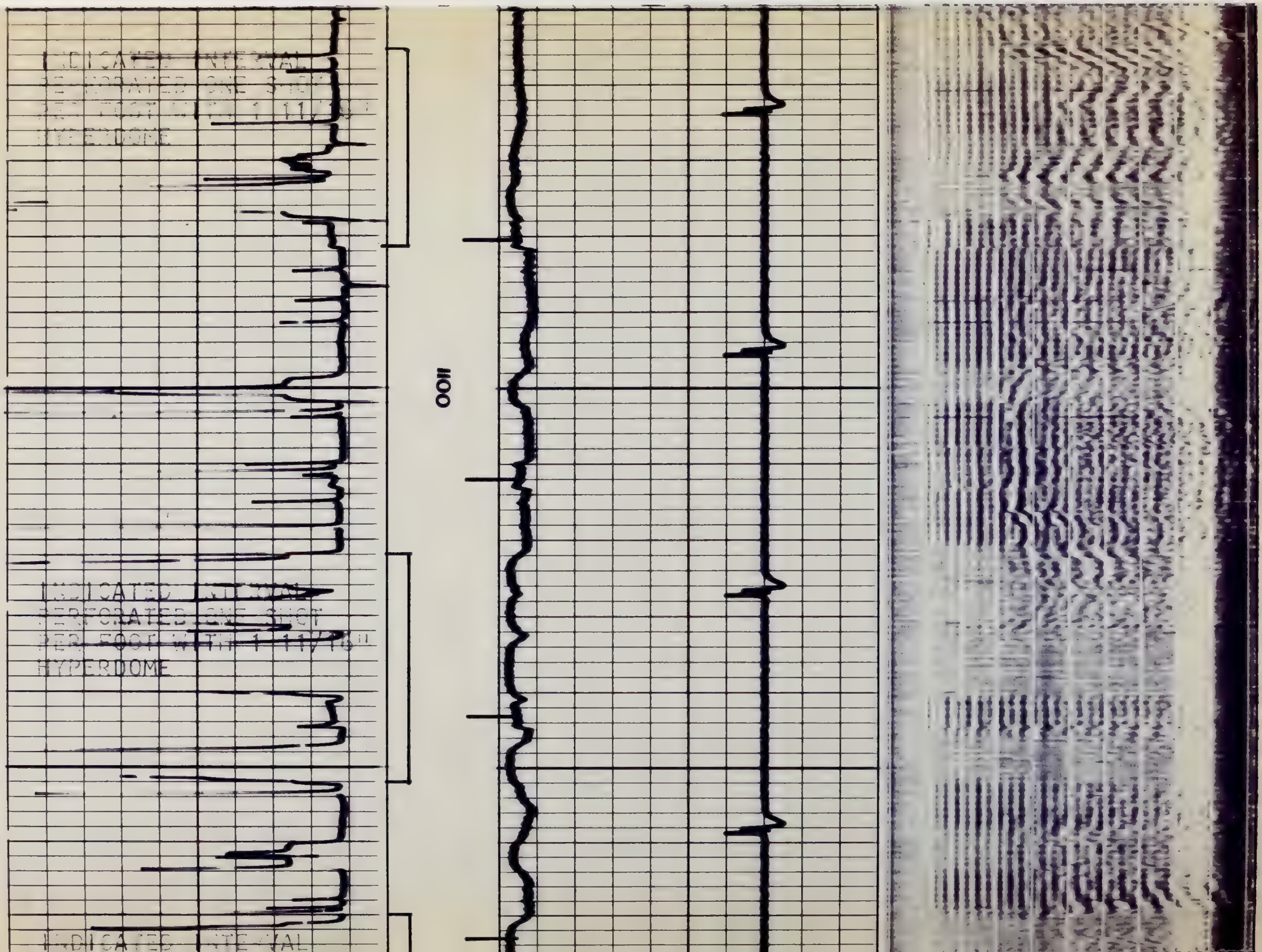

3
2
1
1000
4
3
2
1

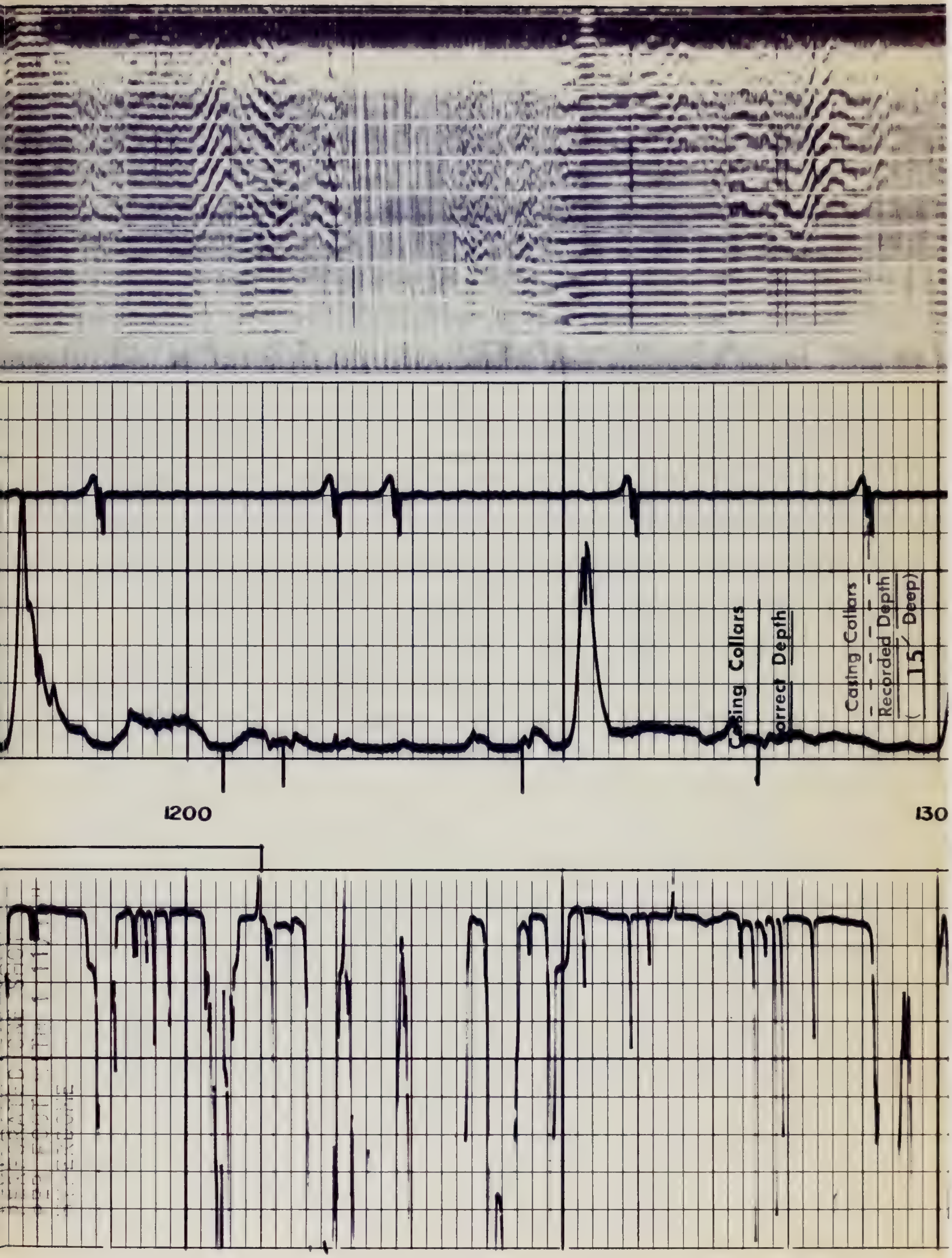

1
SHORT
1

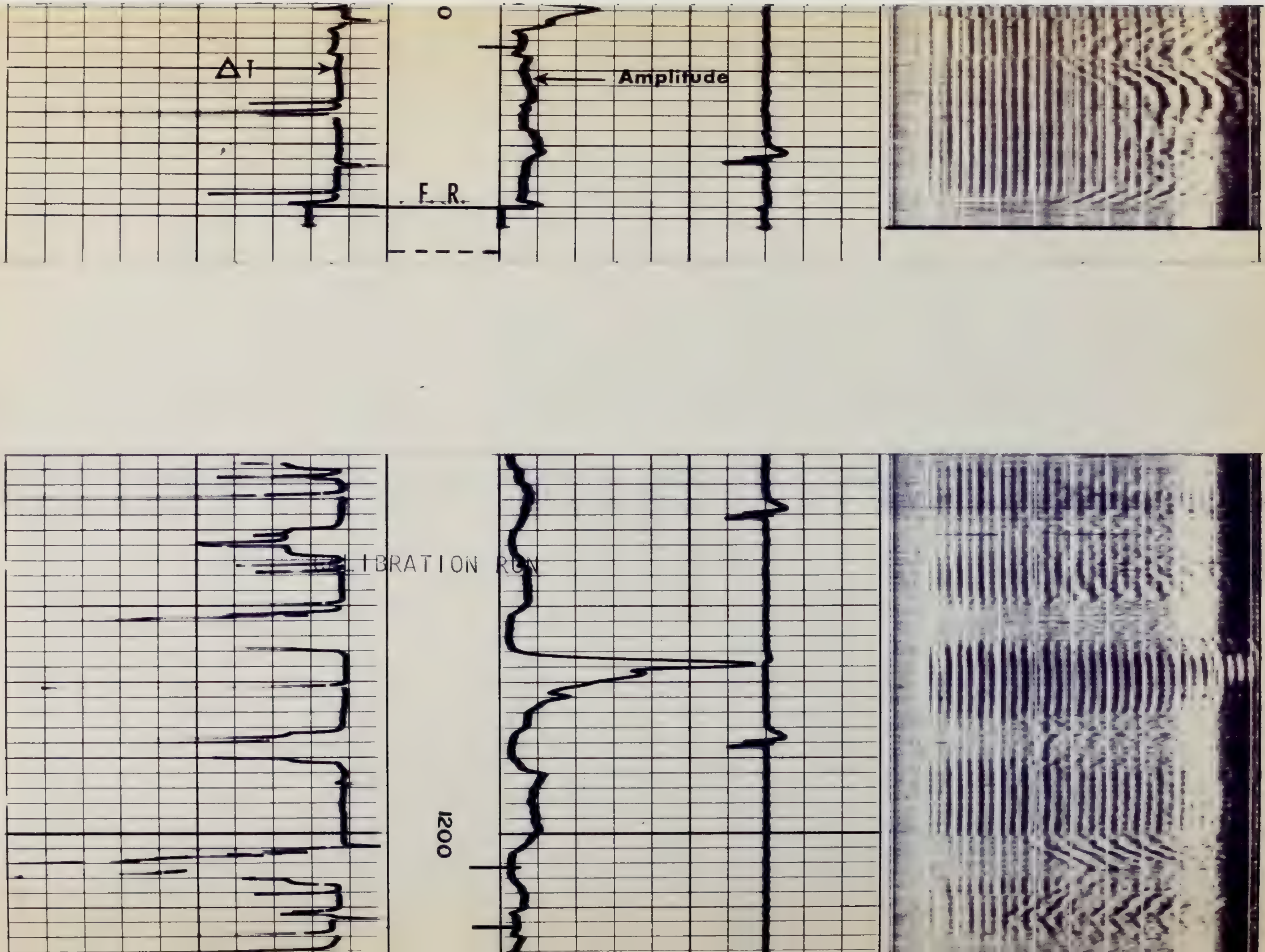

4
3
2
1
3
2
1
0700
ΔT
Amplitude
Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(15′ Deep)
C

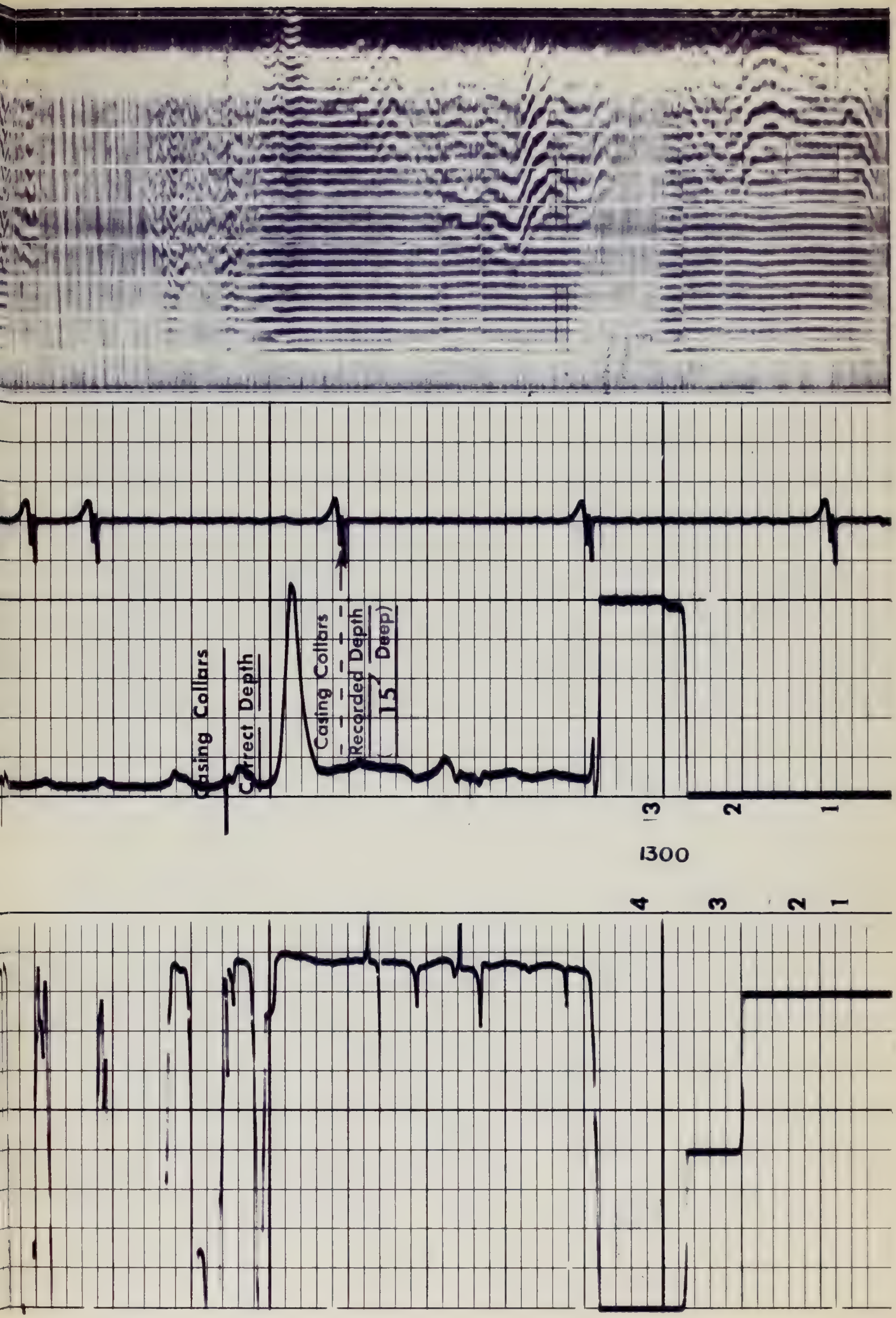

PROBABLE CEMENT TOP
0800
0900
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH 1 11/16
HYPERDOME
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH 1 11/16
HYPERDOME

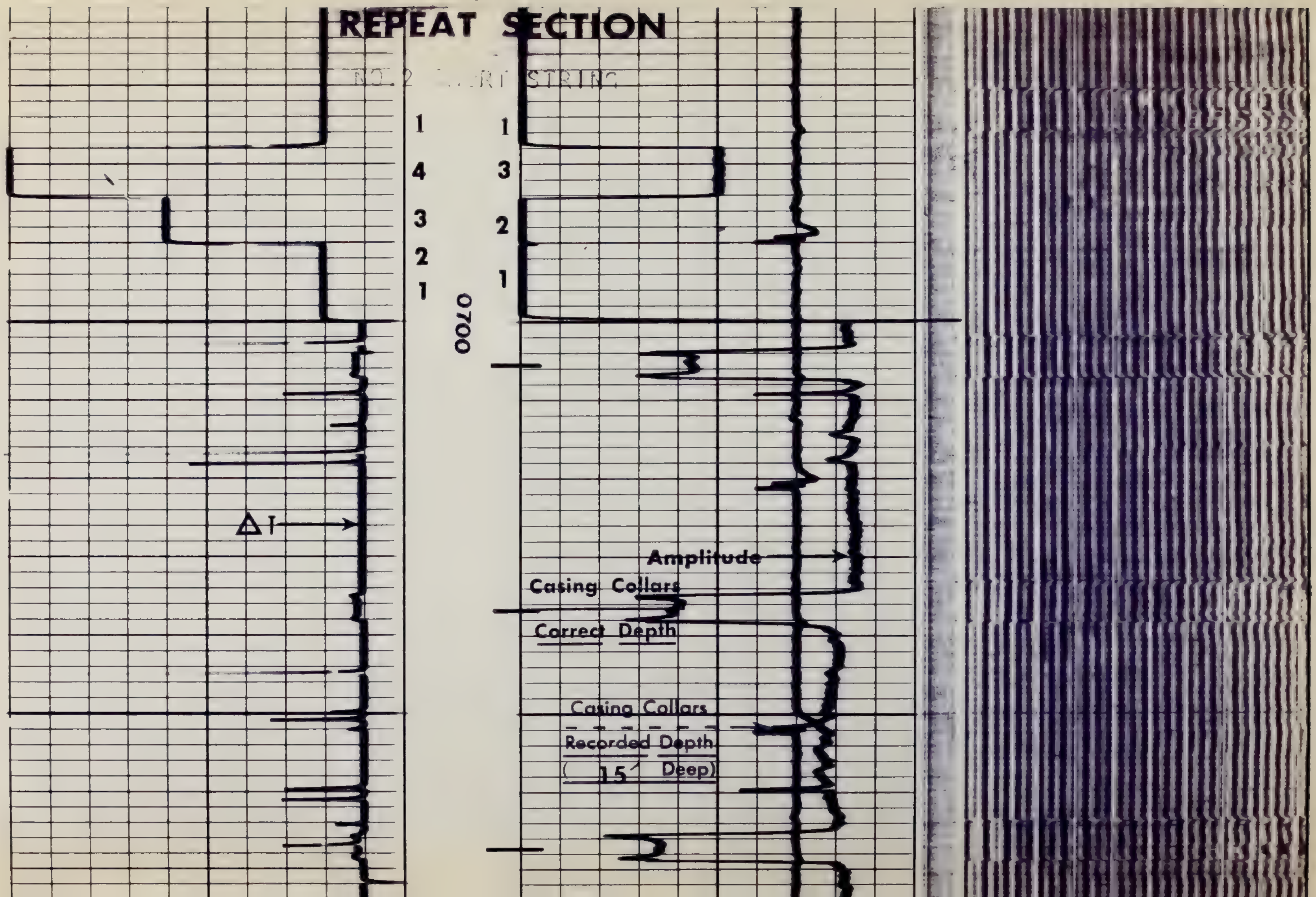

1000
ICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH 1 11/16"
HYPERDOME
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH 1 11/16"
HYPERDOME
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH 1 11/16"

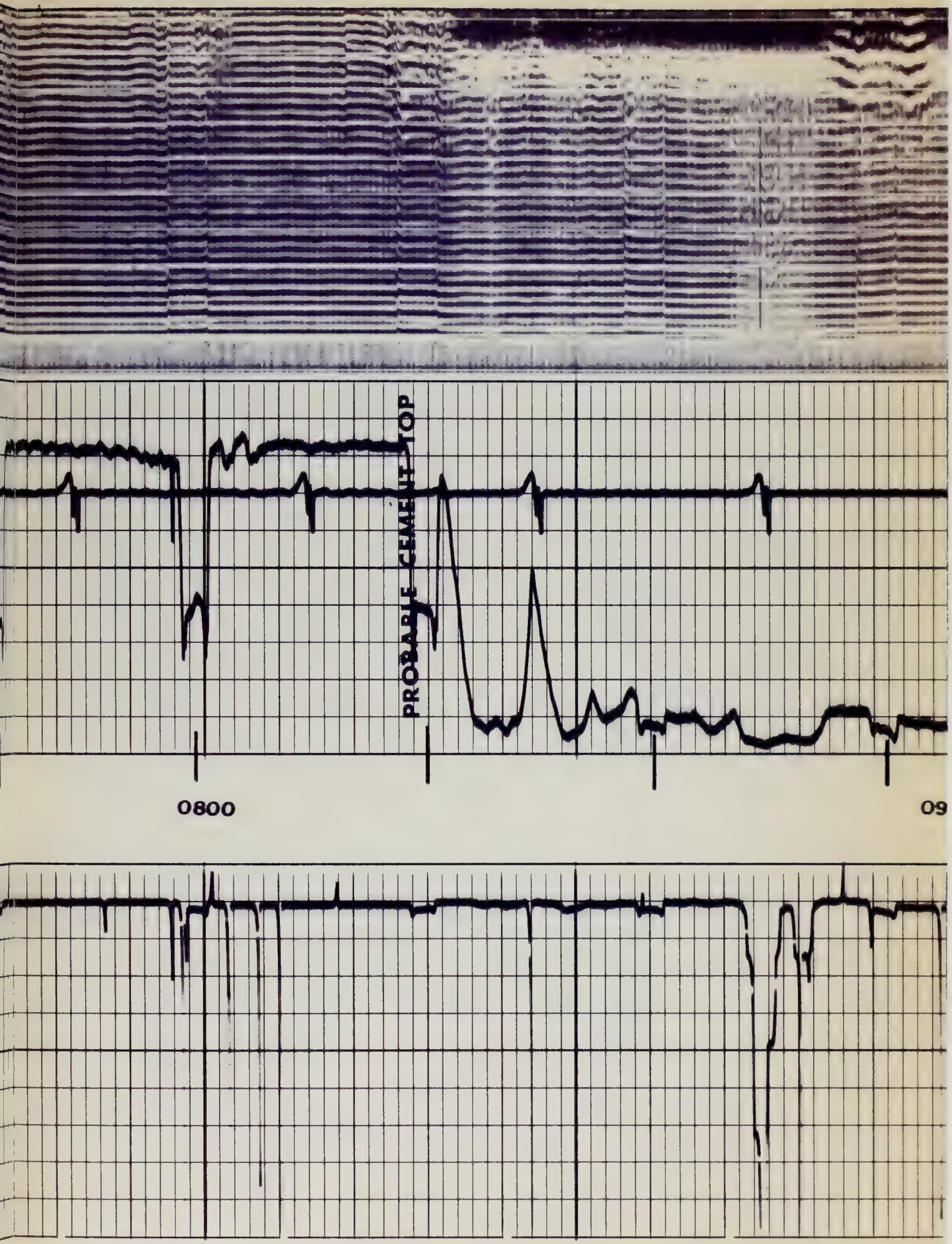

INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH 1 11/16"
HYPERDOME
1100
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH 1 11/16"
HYPERDOME
INDICATED INTERVAL

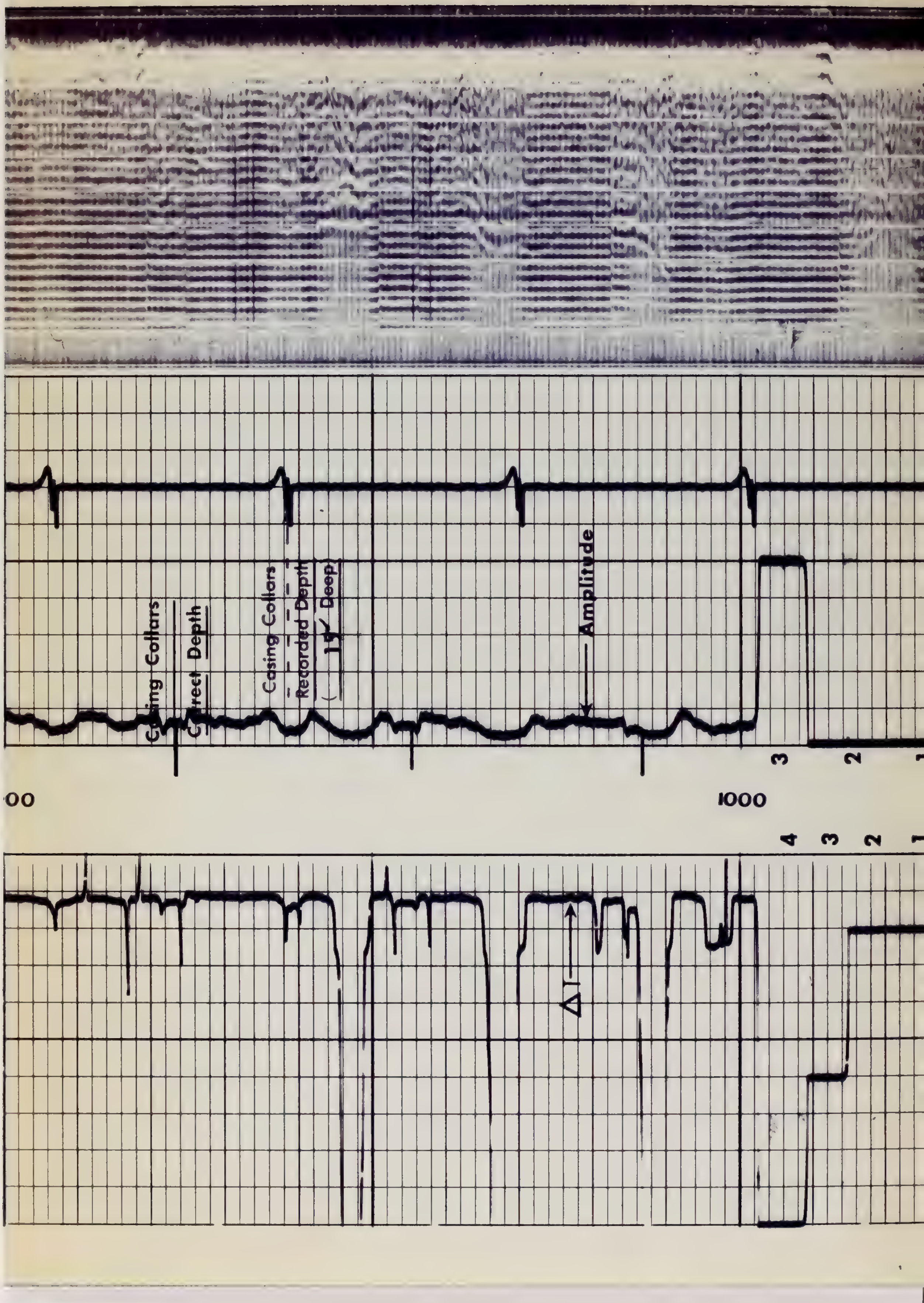

1200
130
Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(15' Deep)


ΔT
0
Amplitude
F.R.
CALIBRATION RUN
1200


Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(15' Deep)
3
2
1
1300
4
3
2
1


REPEAT SECTION
NO. 2 SHORT STRING
1
4
3
2
1
1
3
2
1
0700
ΔT
Amplitude
Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(15´ Deep)


PROBABLE CEMENT TOP
0800
09


Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(15' Deep)
Amplitude
ΔT
00
1000
3
2
4
3
2
1

Casing Collars
Corrected Depth

TRANSIT TIME	DEPTH	CASING BOND	VARIABLE DENSITY
MICROSECONDS ______ SPACING 400 - - - - 200		MILLIVOLTS 0 ______ 100	MICROSECONDS ______ SPACING 200 ______ 1200

COMPANY ATLANTIC RICHFIELD COMPANY

WELL S.G. NO. 9

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 2712
SCHL. TD 2720
DRLR TD ----
Elev:
KB ----
DF ----
GL 6870

CEMENT BOND CALIBRATION CODING

	Δt	AMPLITUDE
1.	MECHANICAL ZERO	MECHANICAL ZERO
2.	240 μ sec	ELECTRICAL ZERO
3.	320 μ sec	CALIBRATE
4.	400 μ sec	

COUNTY

Schlumberger

ORIENTED PERFORATING RECORD AND CASING COLLAR LOG

COUNTY RIO BLANCO
FIELD or LOCATION
WELL S.G. NO.9
COMPANY ATLANTIC RICHFIELD COMPANY

COMPANY ATLANTIC RICHFIELD COMPANY

WELL S.G. NO.9

FIELD

COUNTY RIO BLANCO STATE COLORADO

Location:

Sec. 11 Twp. [illegible] Rge. 97W

Other Services:
CBL-GR-VDL
1 AND 2

Permanent Datum: GROUND LEVEL ; Elev.: 6370
Log Measured From GL , 0 Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B. -----
D.F. -----
G.L. 6370

Date	10/31,11/4/74
Run No.	ONE
Pipe String No.	1 AND 2
Pipe String Ident.	LONG & SHORT
Type Orienting	POWERED
Type fluid in hole	WATER
Salinity, PPM Cl.	-----
Density	-----
Level	FULL
Max rec. temp., deg F.	-----
Operating rig time	----
Recorded by	ST. AUBYN
Witnessed by	MR. BURNS

BORE-HOLE RECORD			CEMENTING RECORD				
Bit	From	To		Type	Wgt.	From	To
7 7/8	[illegible]	2750	Primary	HOWCO LT. WT.	---	3[illegible]5	2740
			Squeeze	10# GILSONITE/SK			

FOLD HERE

The well name, location and borehole reference data were furnished by the customer.

SWS-1521-A

The well name, location and borehole reference data were furnished by the customer.

EQUIPMENT DATA			
Hoist Truck No.	3002	Rotator Size	1 11/16"
Inst. Truck No.	3002	Rotator No.	511
Tool Serial No.	511	Indexer Type	PCD-D
Location	VERNAL	Indexer No.	511

DEPTHS RELATE TO

Radioactivity Measurements ☒
Schlumberger Line Measurements ☐

CASING COLLARS	

PERFORATING DATA					LOGGING DATA				
Depths									
From	To	No. Shots	Gun Size	Gun Type	Time Const.	Sens. Setting	Zero Shift	Calib. Sens.	Calib. Defl.
1310	1345	30	1 11/16	H-D	6	800	1	(NO.1 S	TRING)
1370	2324	553	1 11/16	H-D	NON-	ORIE	NTED	(NO.1 S	TRING)
907	1210	245	1 11/16	H-D	6	300	1	(NO.2 S	TRING

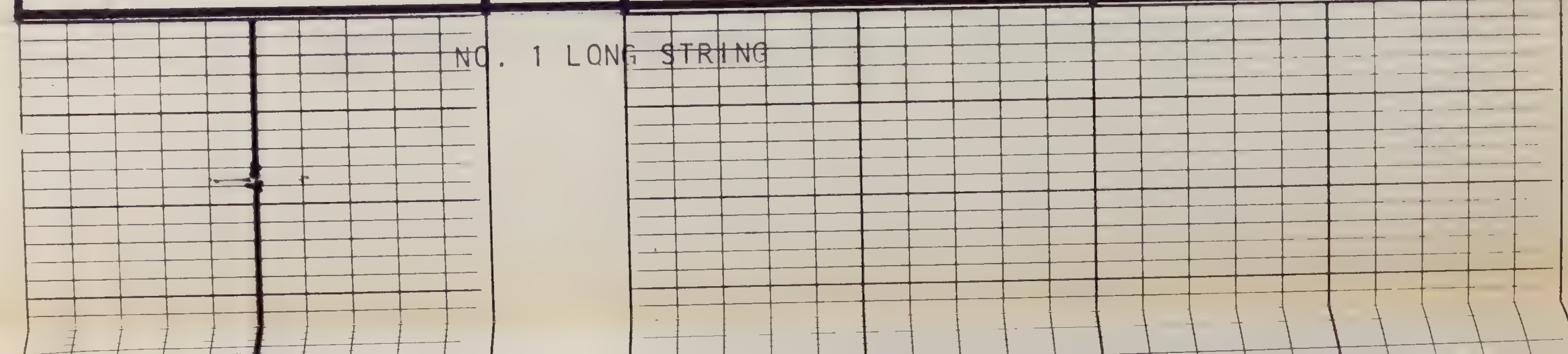
PIPE STRING RECORD

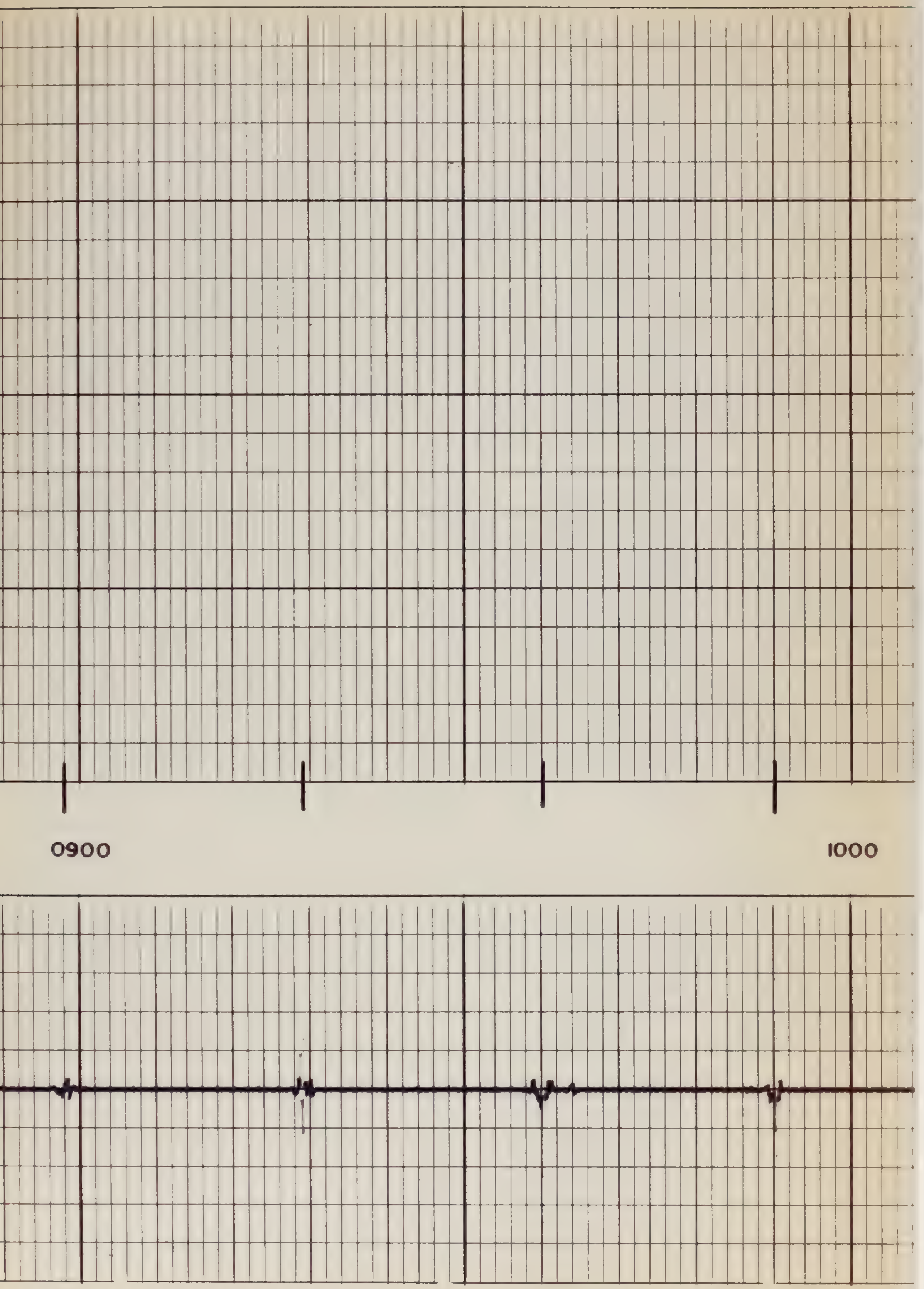
Number	1	2	3	4
Identific't'n	LONG	SHORT		
Size	2 3/8	2 3/8		
Weight	4.7	4.7		
Depth	2740	1313		

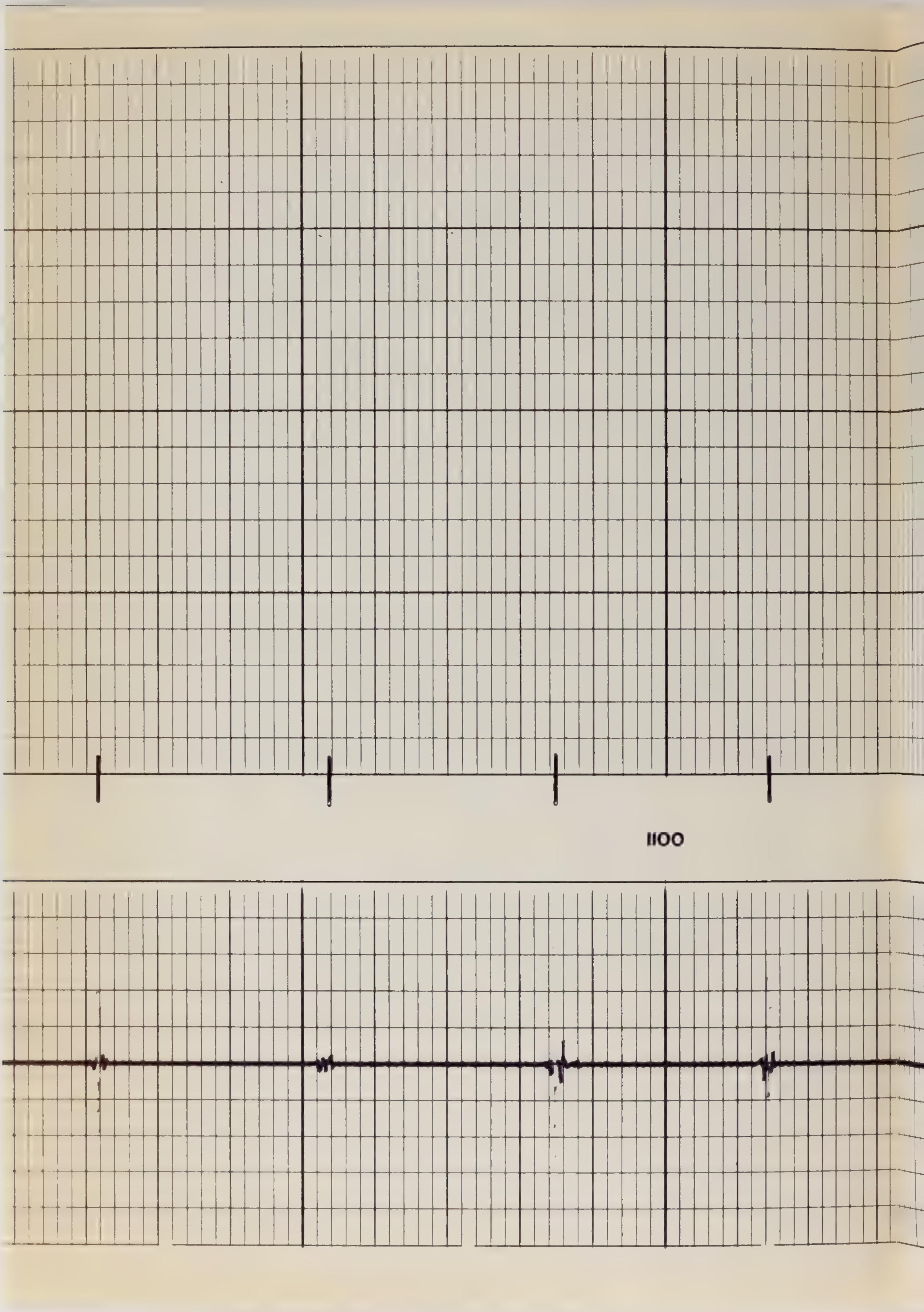
Remarks:

CASING COLLAR LOG
BEFORE PERFORATION

DEPTHS




0900
1000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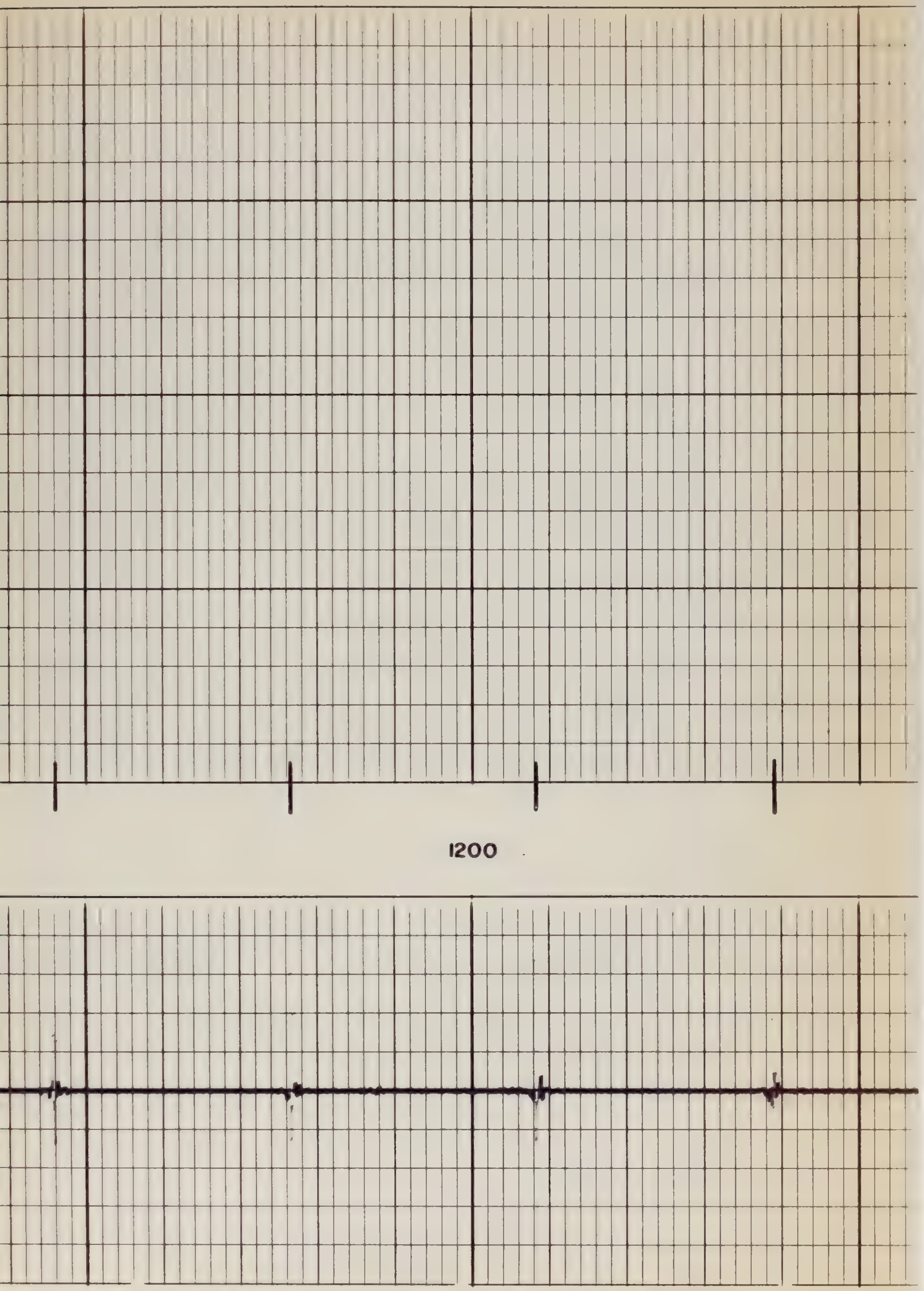
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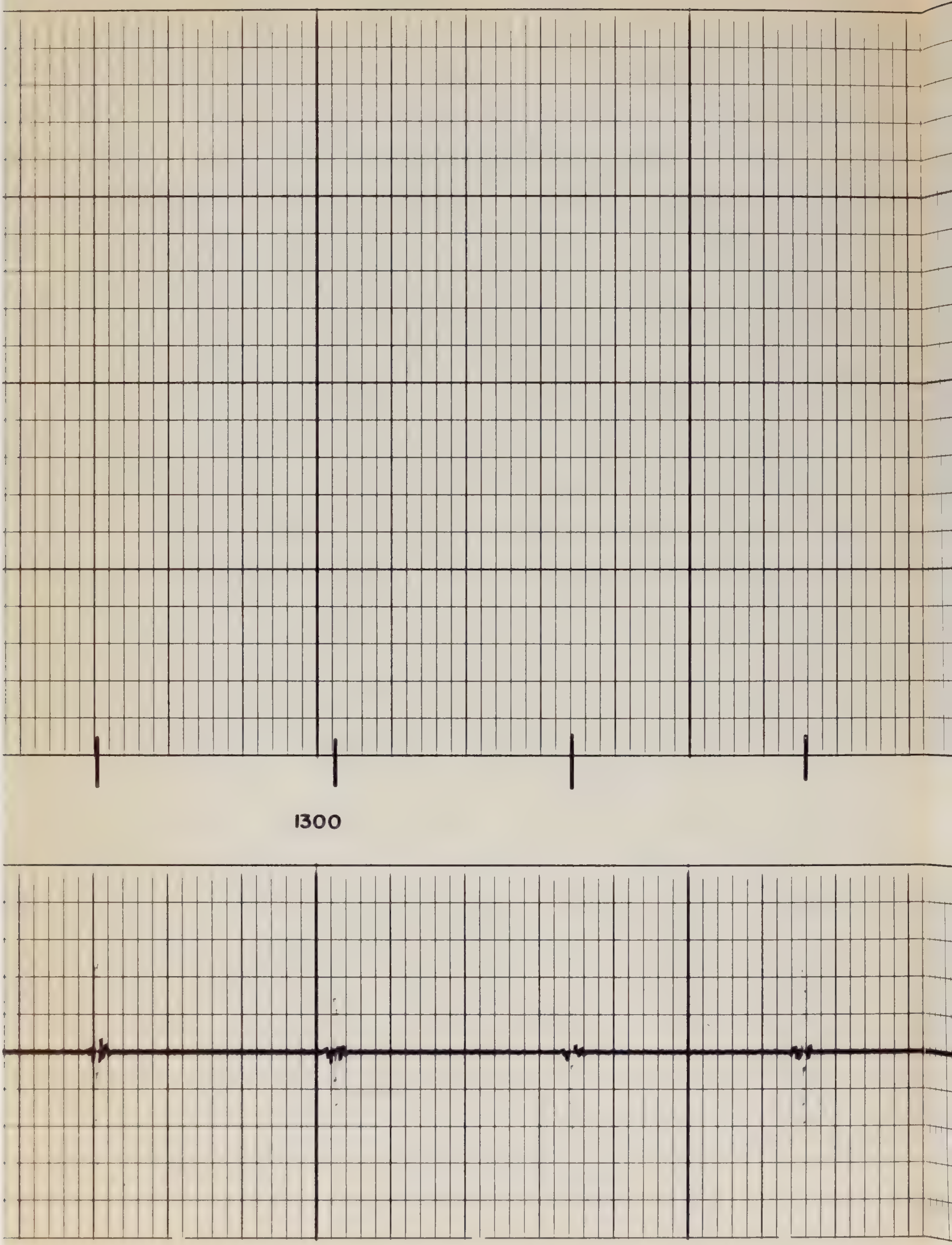
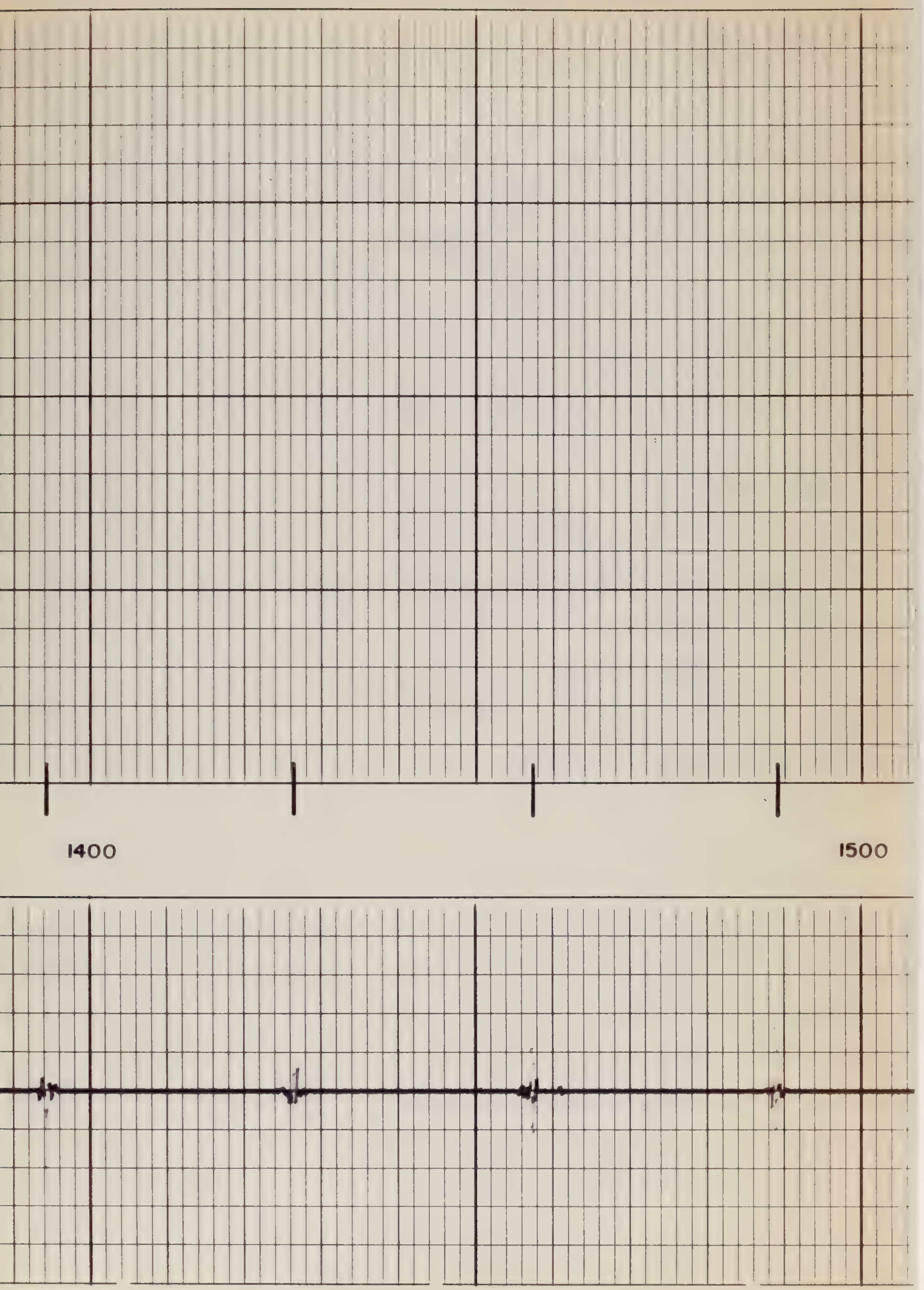
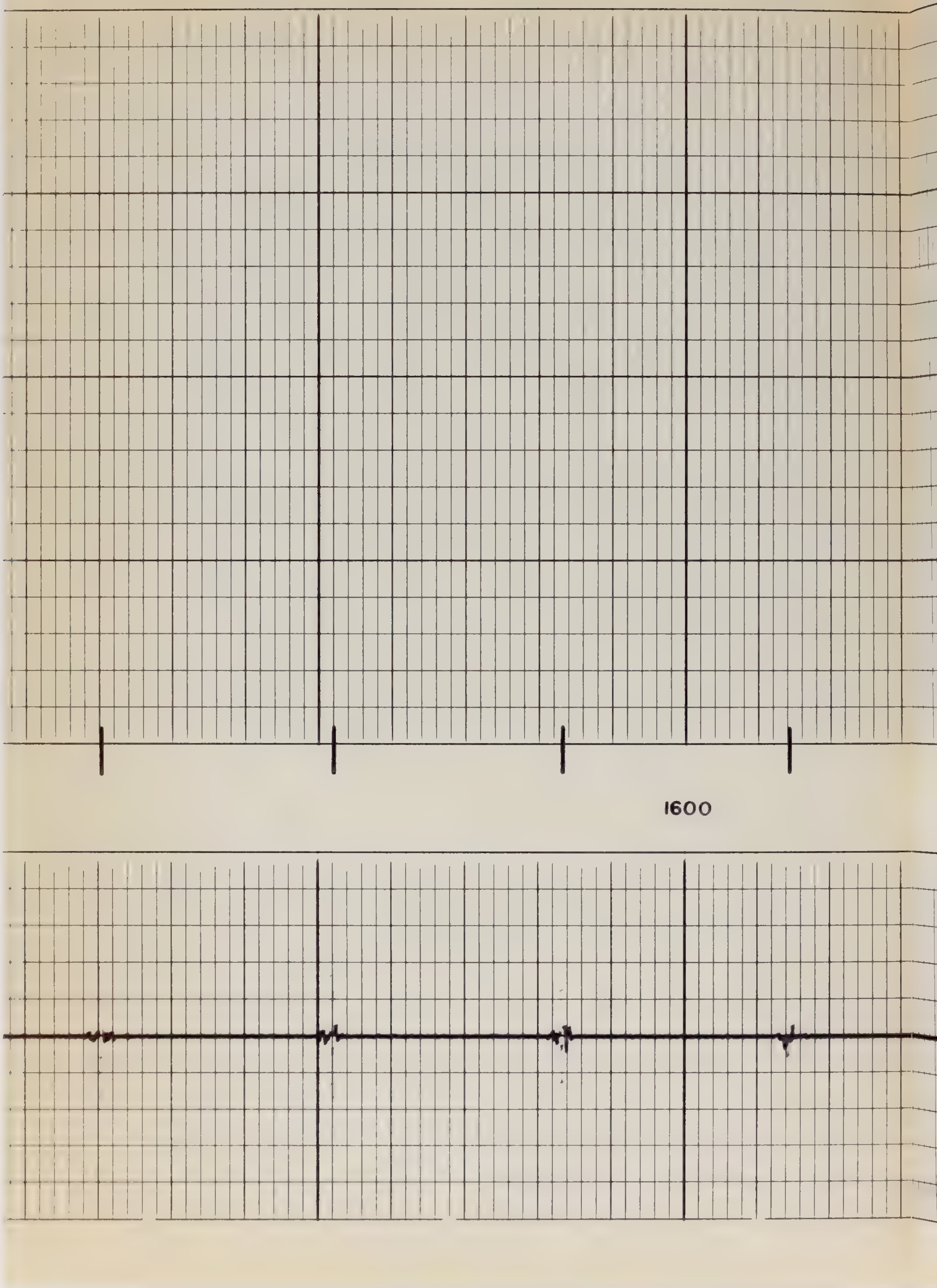
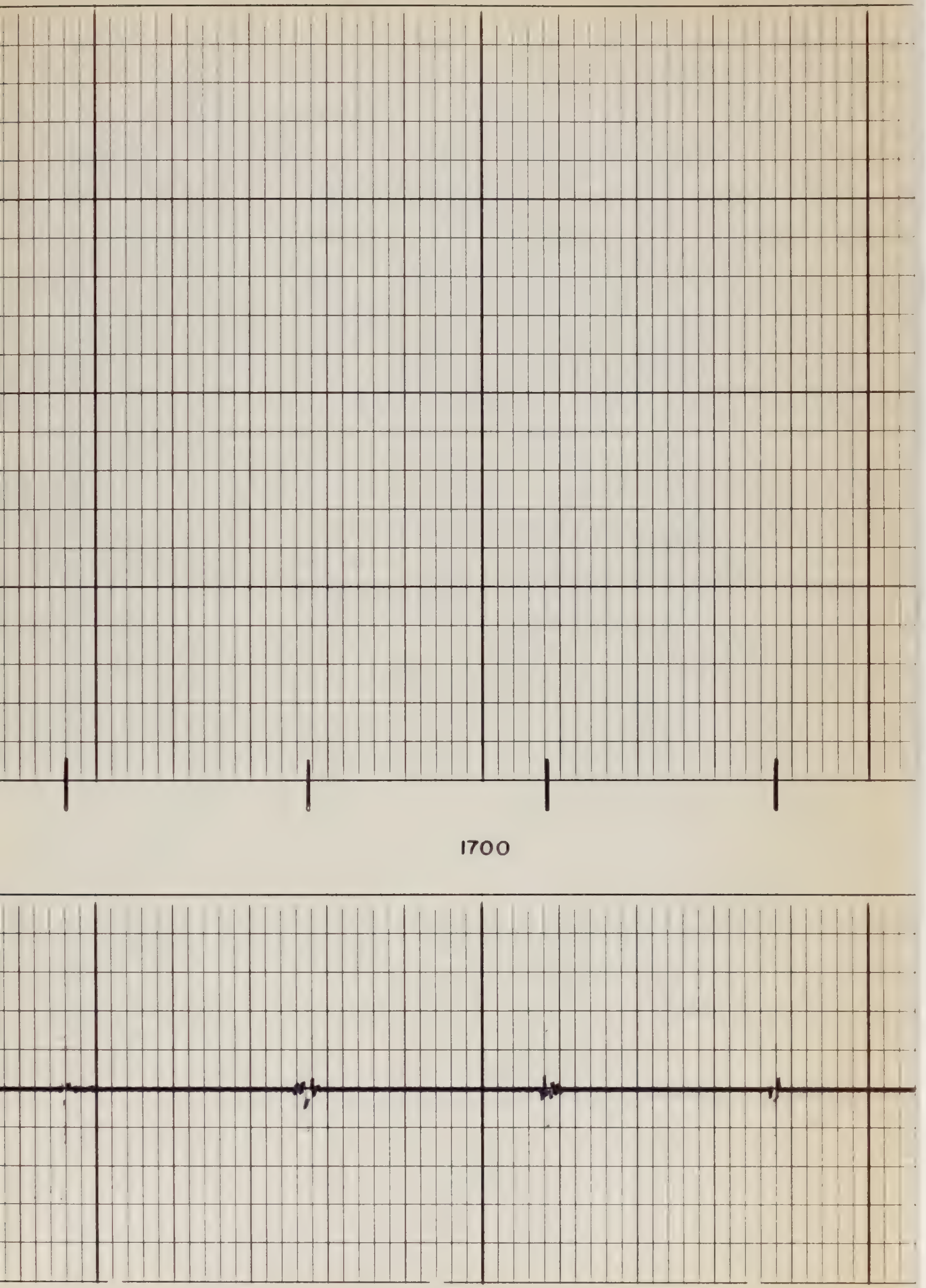
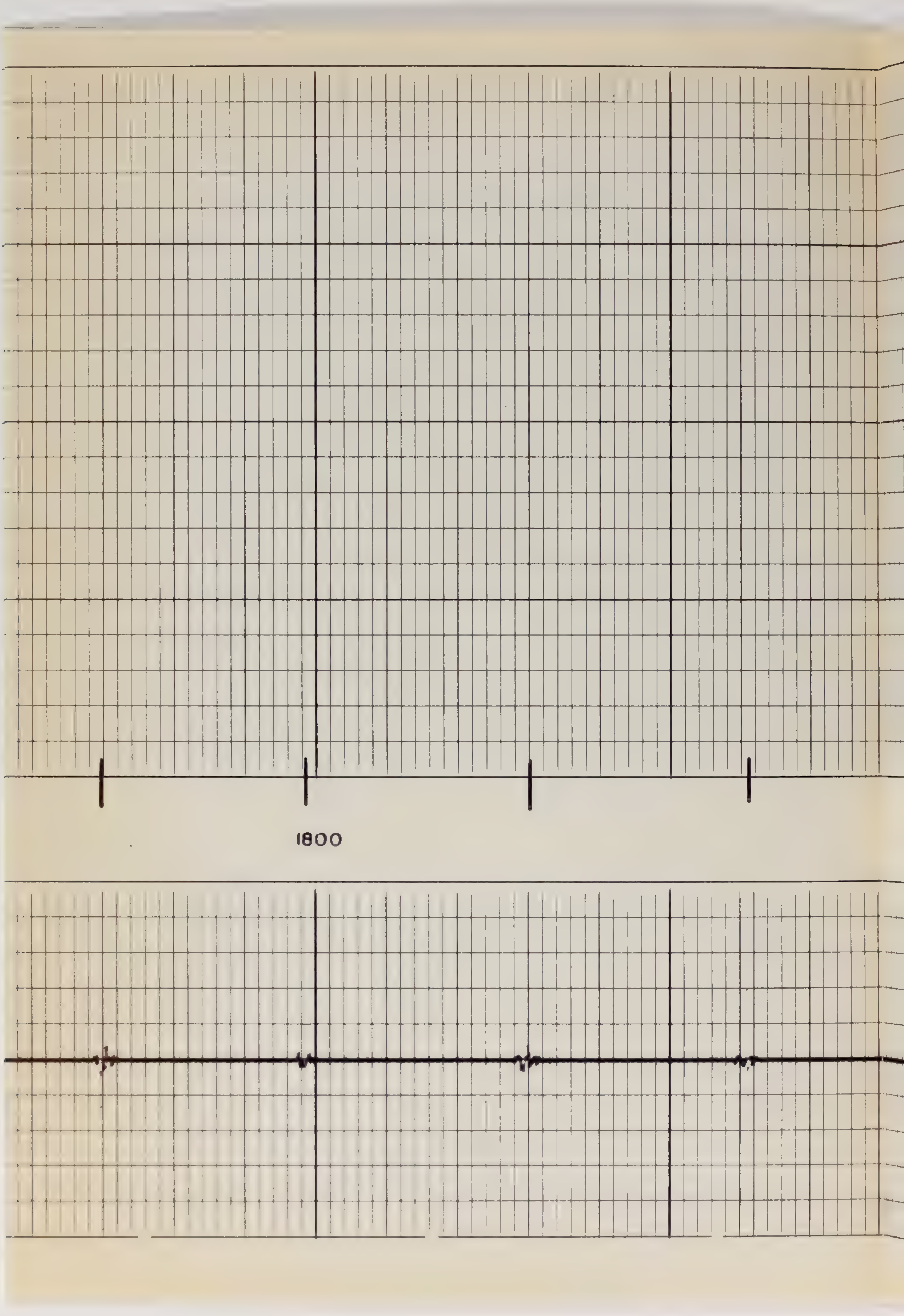
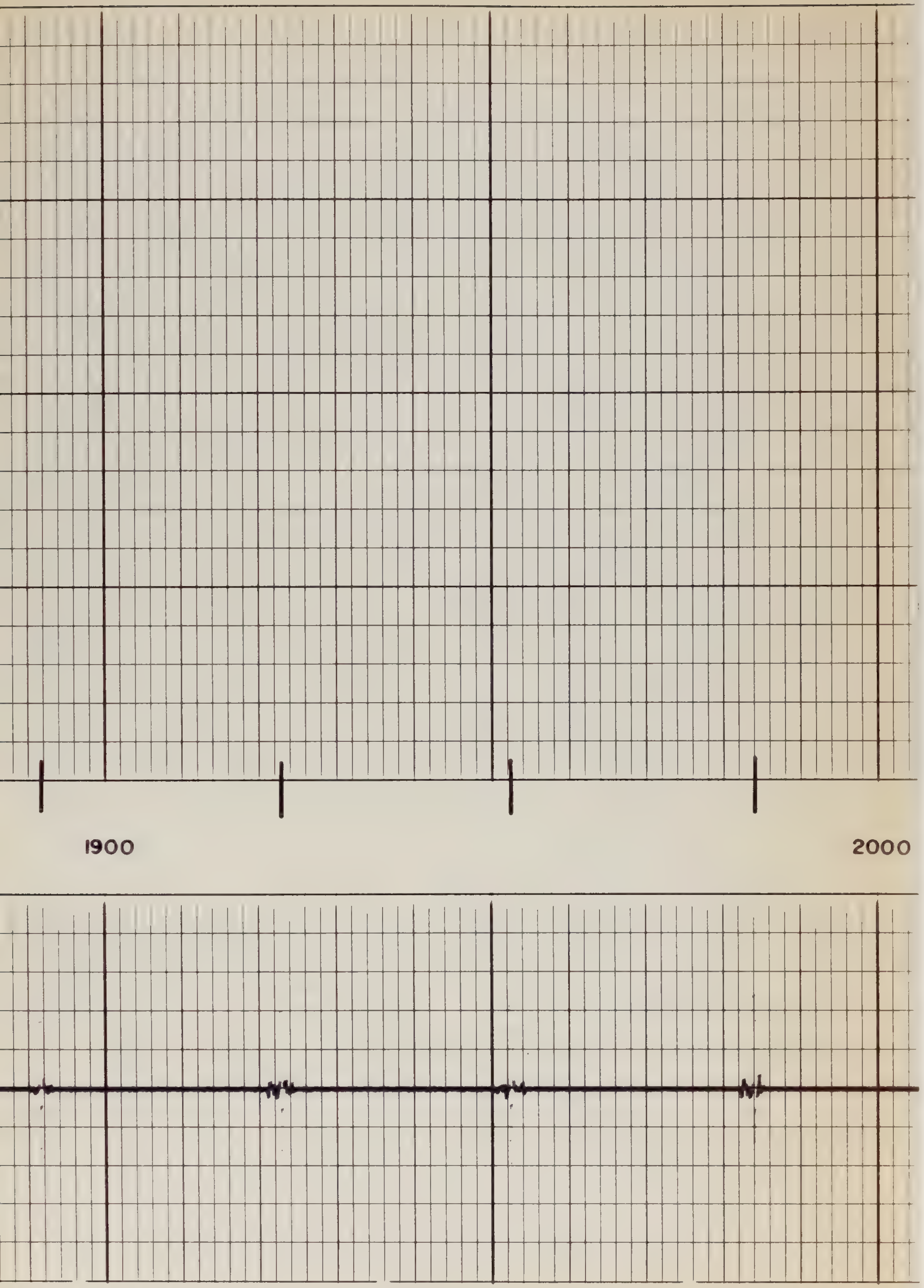

1300

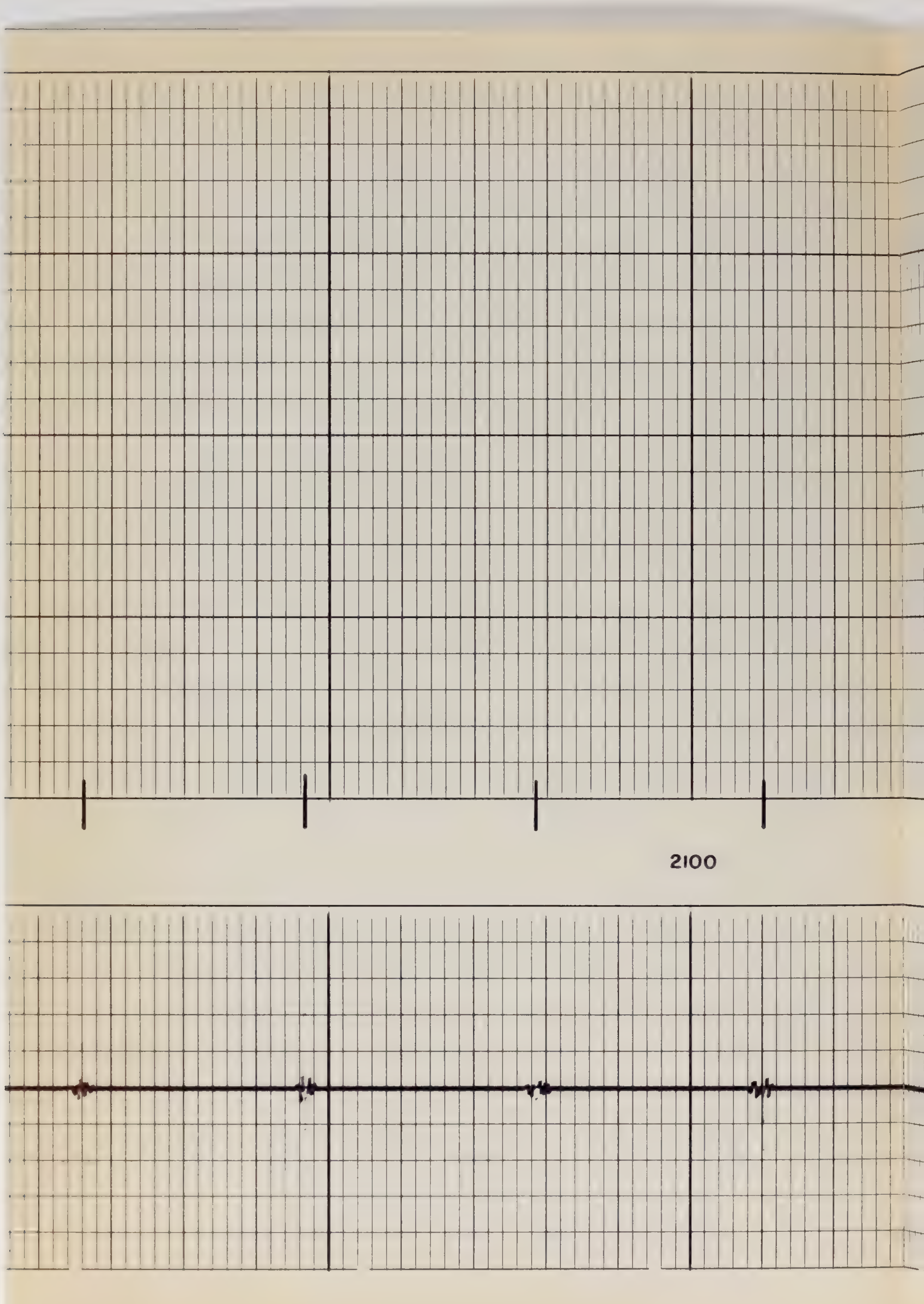

1400
1500


1600


1700


1800


1900
2000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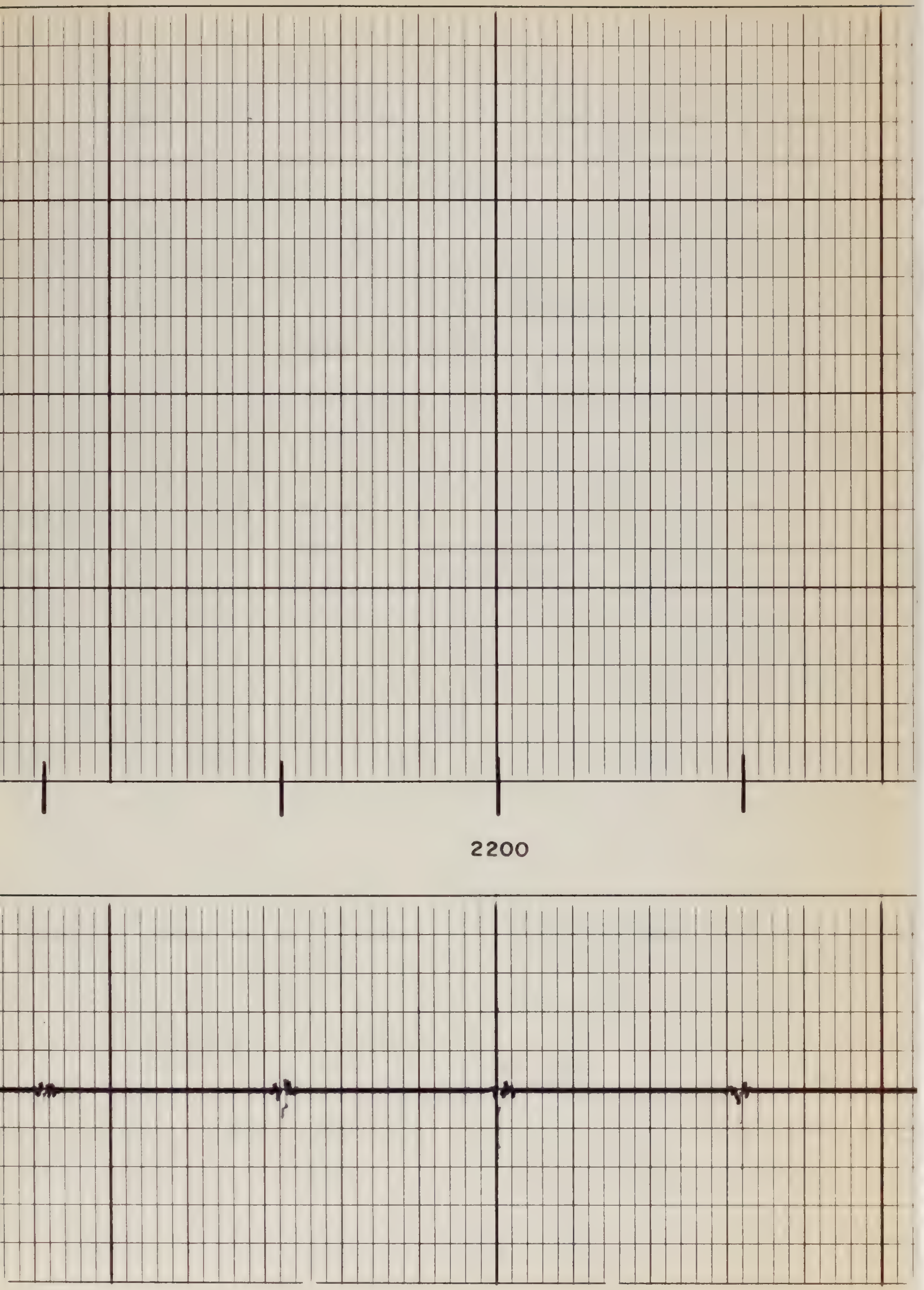
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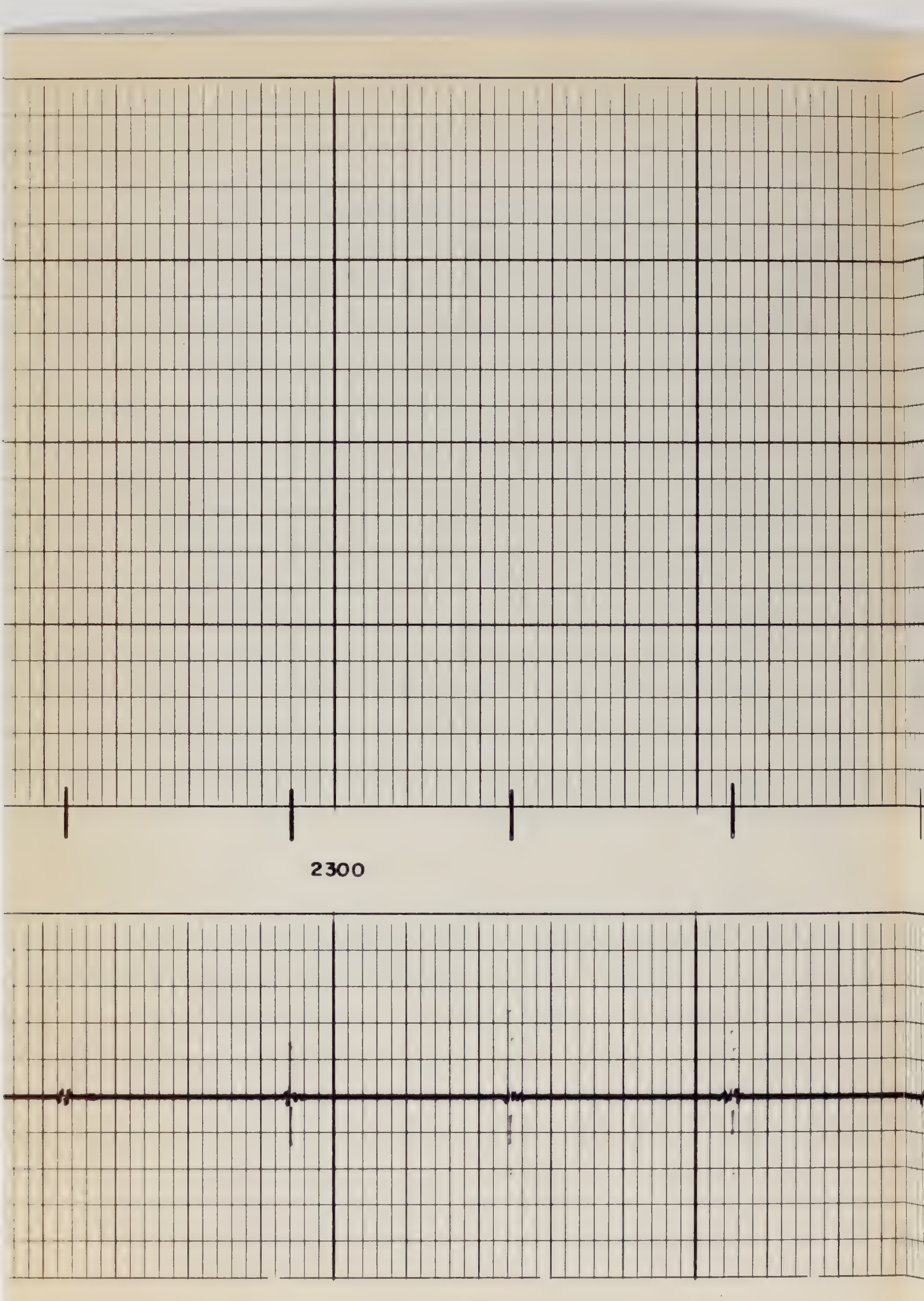
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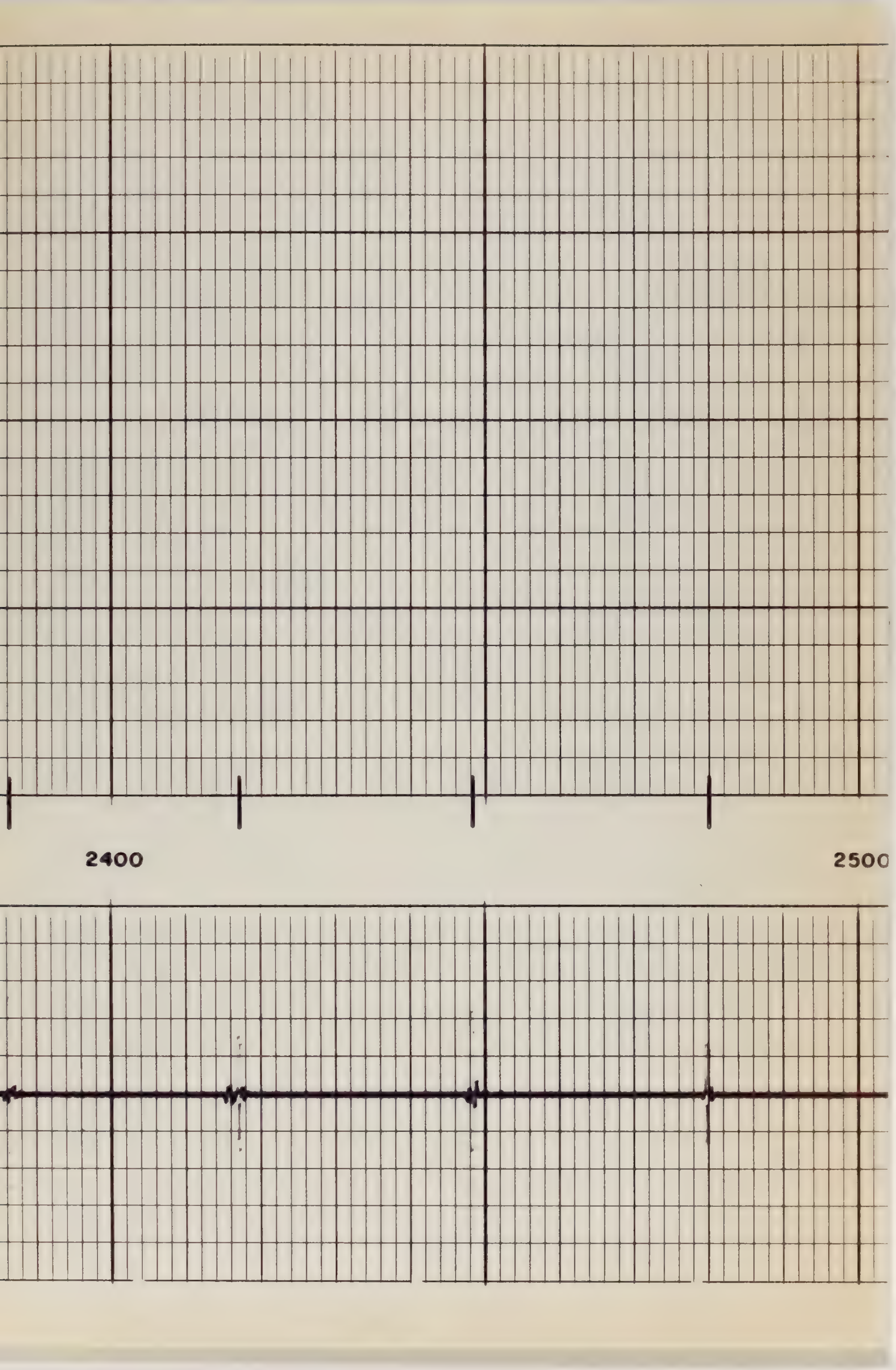
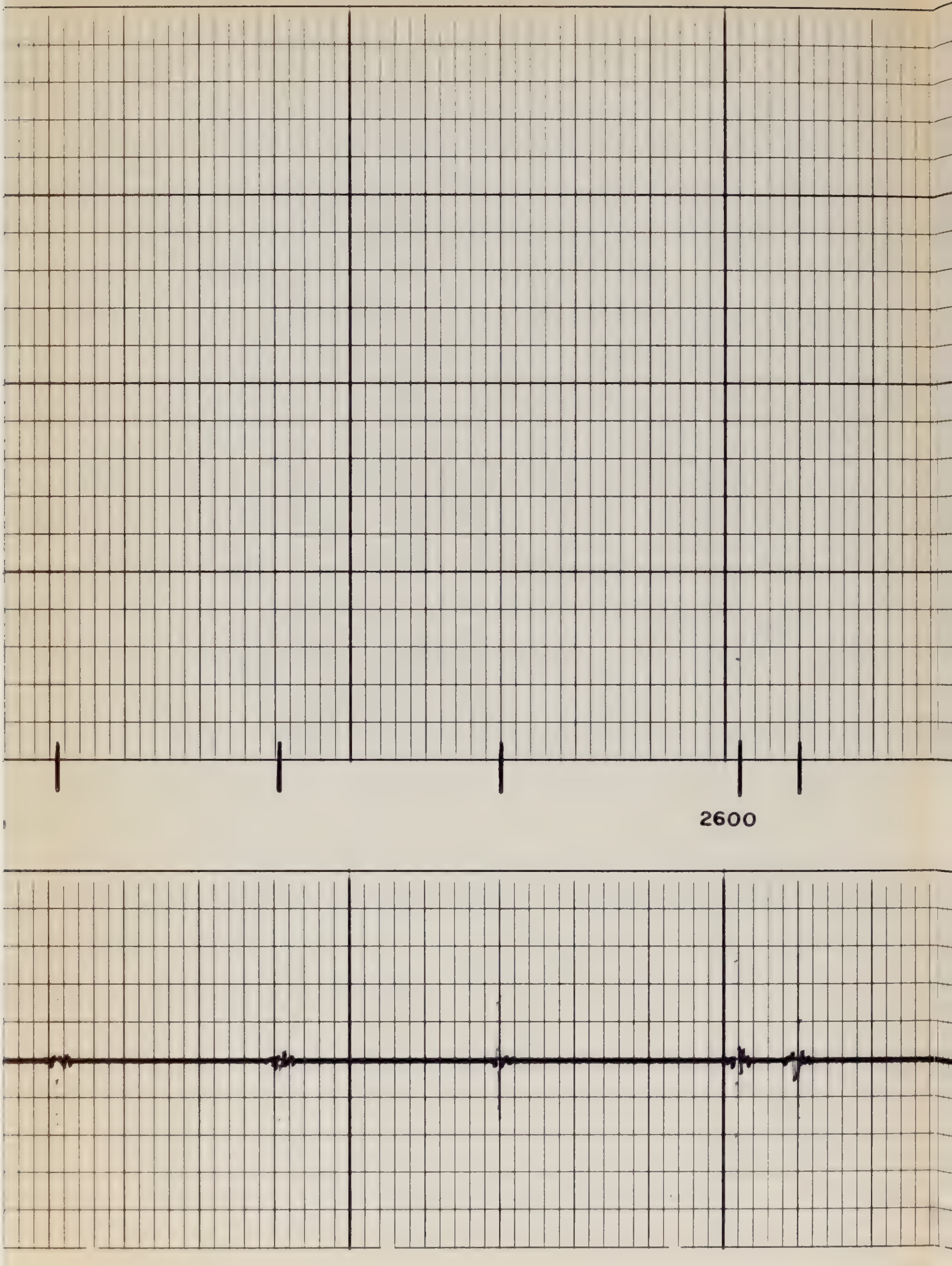
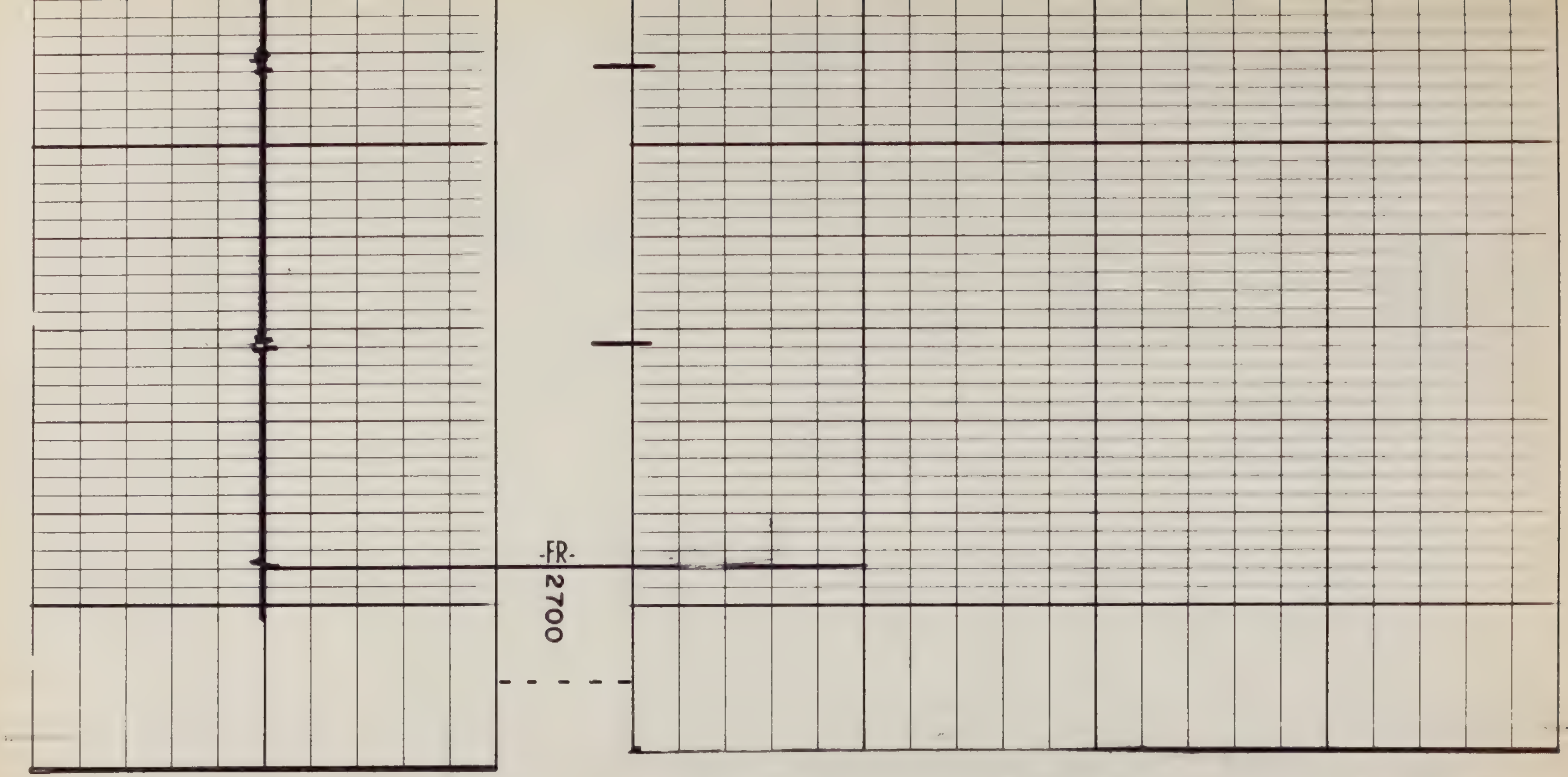
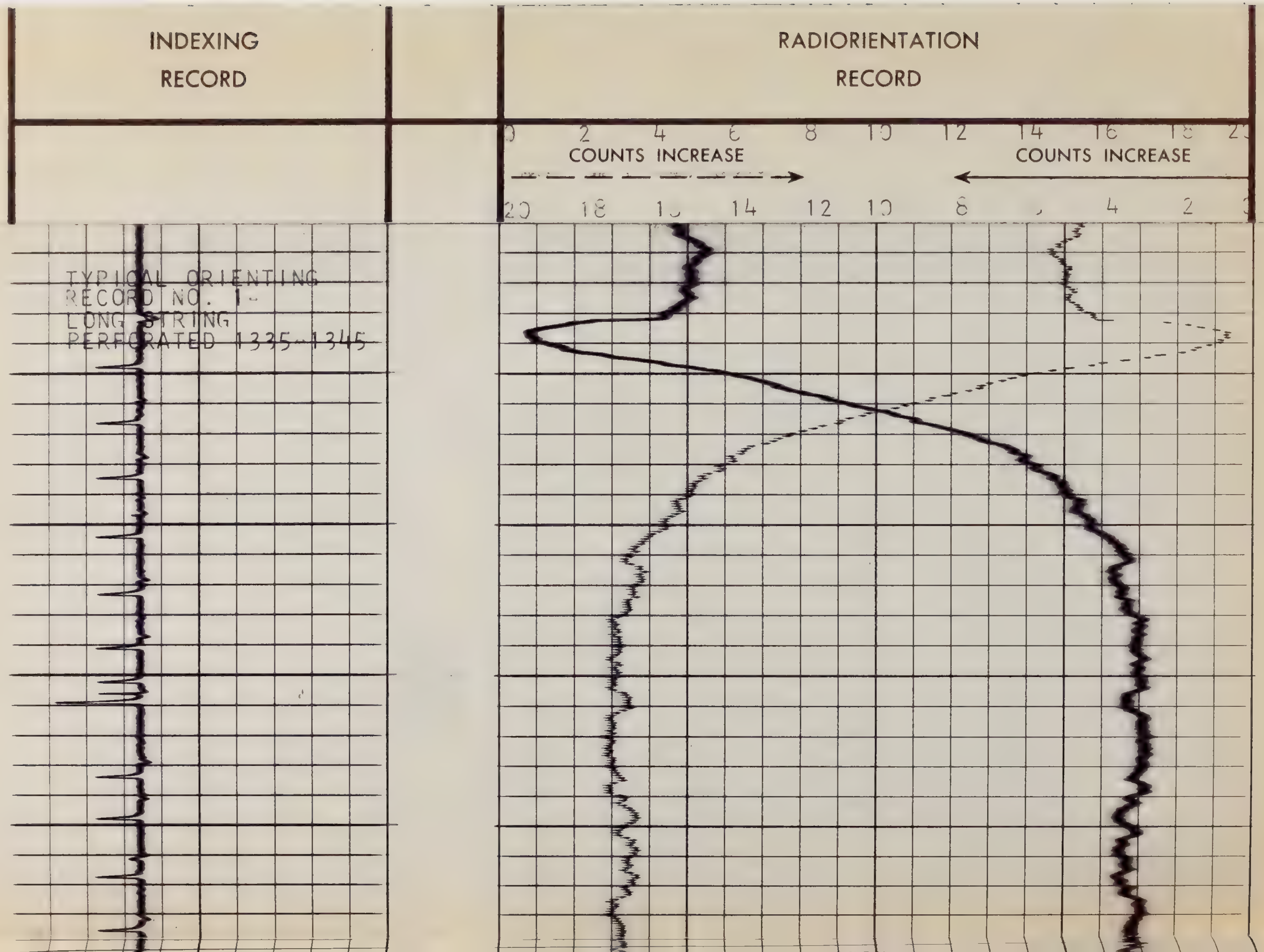
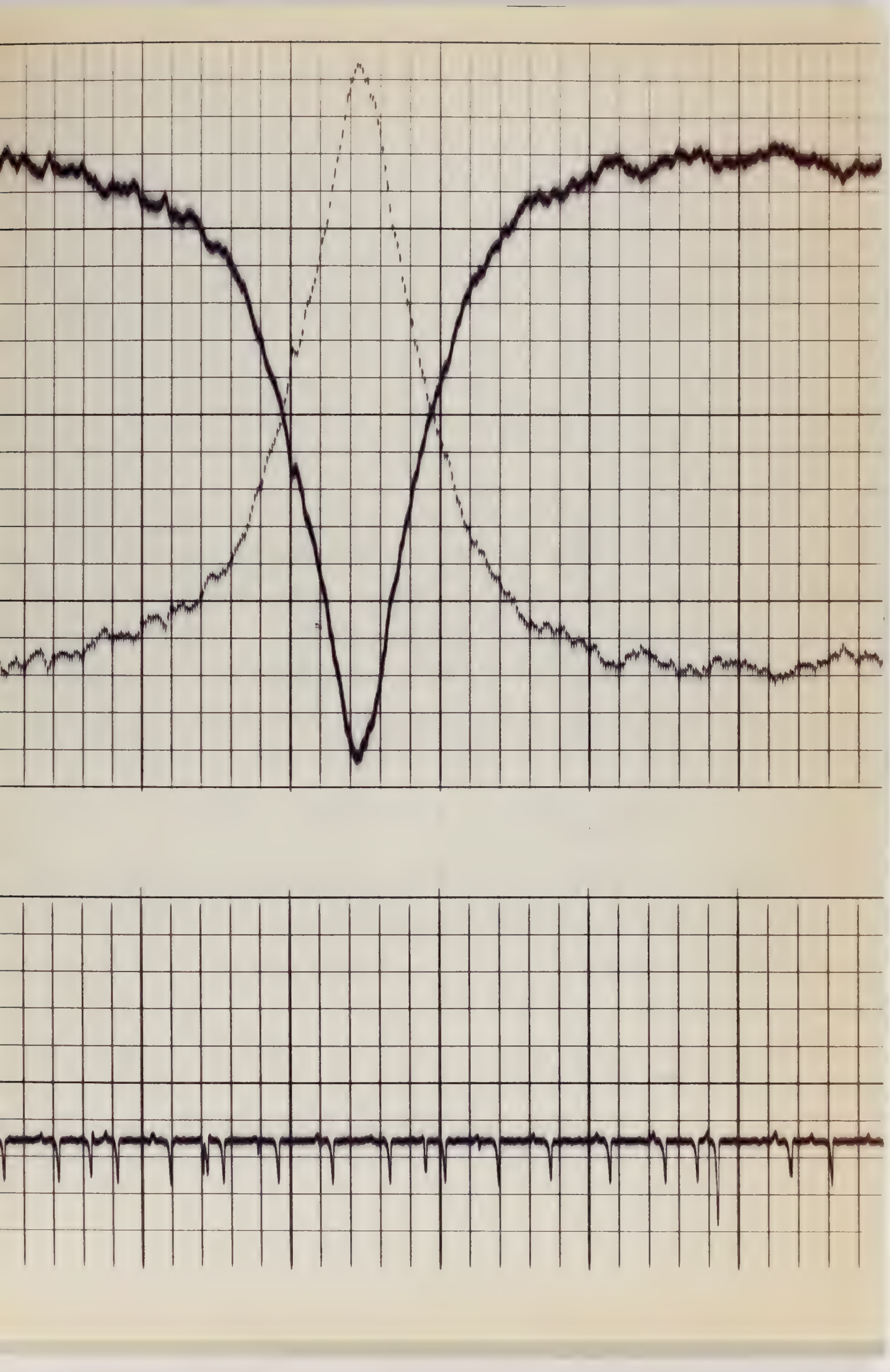

2400
2500

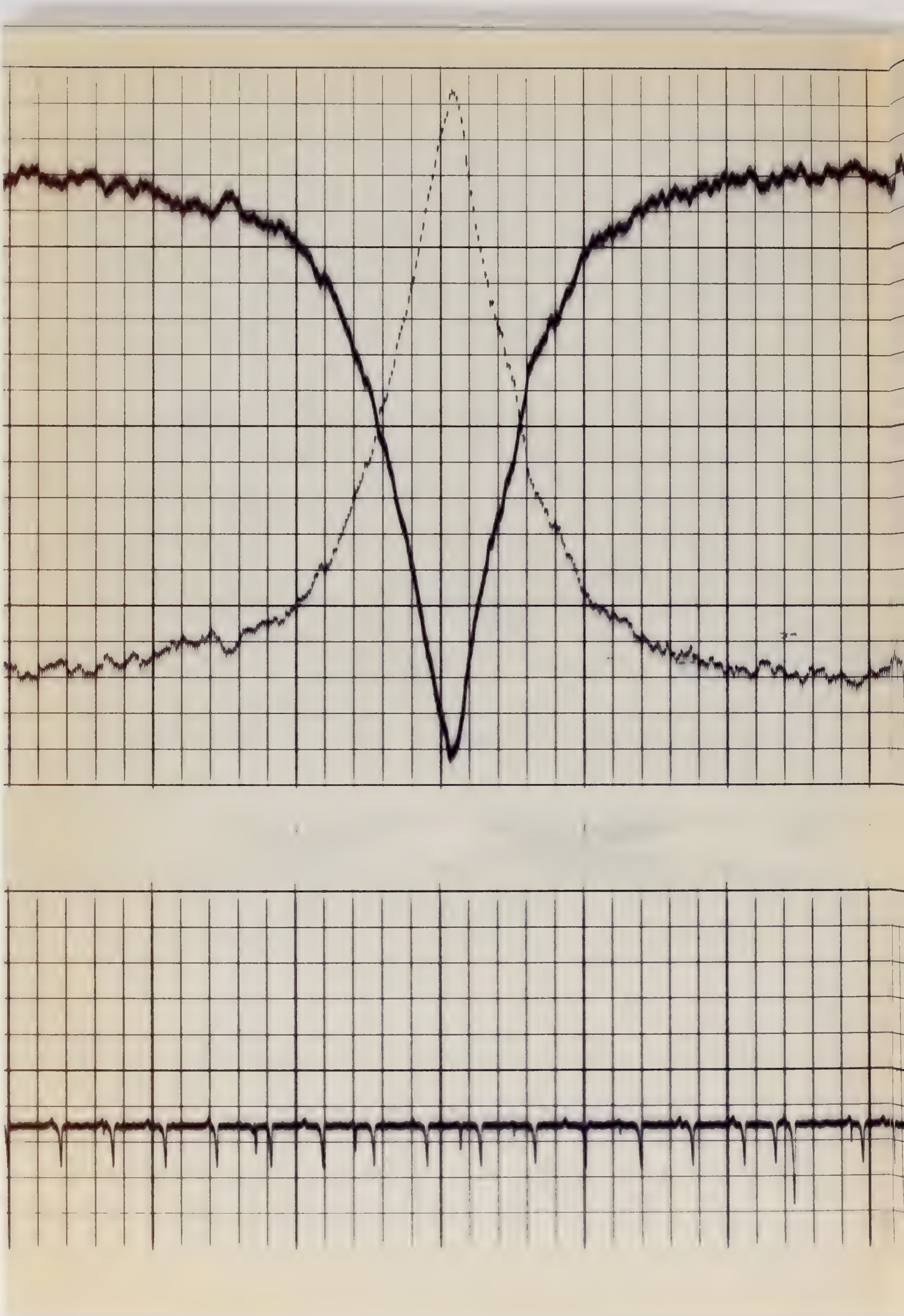

2600

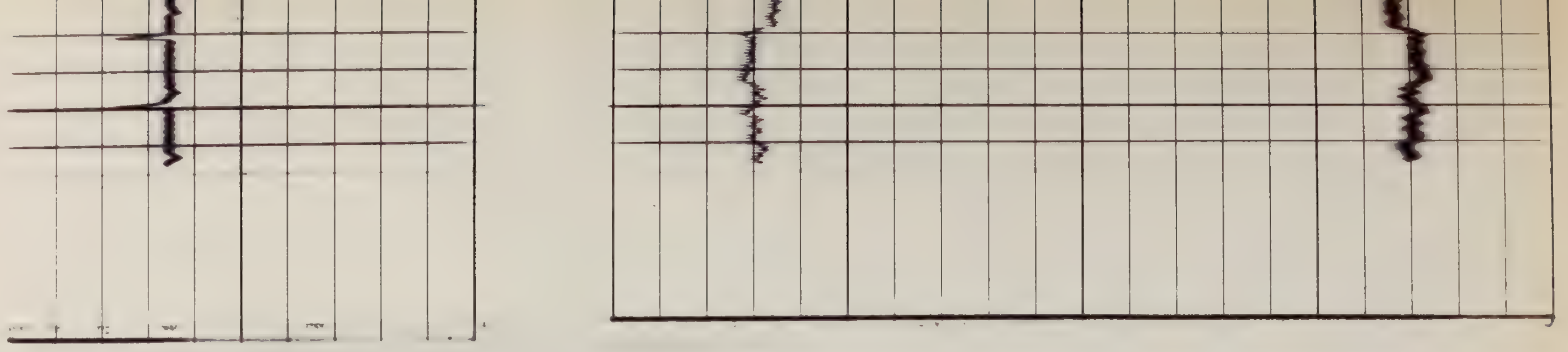


NO.1 LONG STRING RADIORIENTATION RECORD
GUN #1 PERFORATED 1335-1345


INDEXING RECORD
RADIORIENTATION RECORD
0 2 4 6 8 10 12 14 16 18 20
COUNTS INCREASE
COUNTS INCREASE
20 18 16 14 12 10 8 6 4 2 0
TYPICAL ORIENTING
RECORD NO. 1 -
LONG STRING
PERFORATED 1335-1345



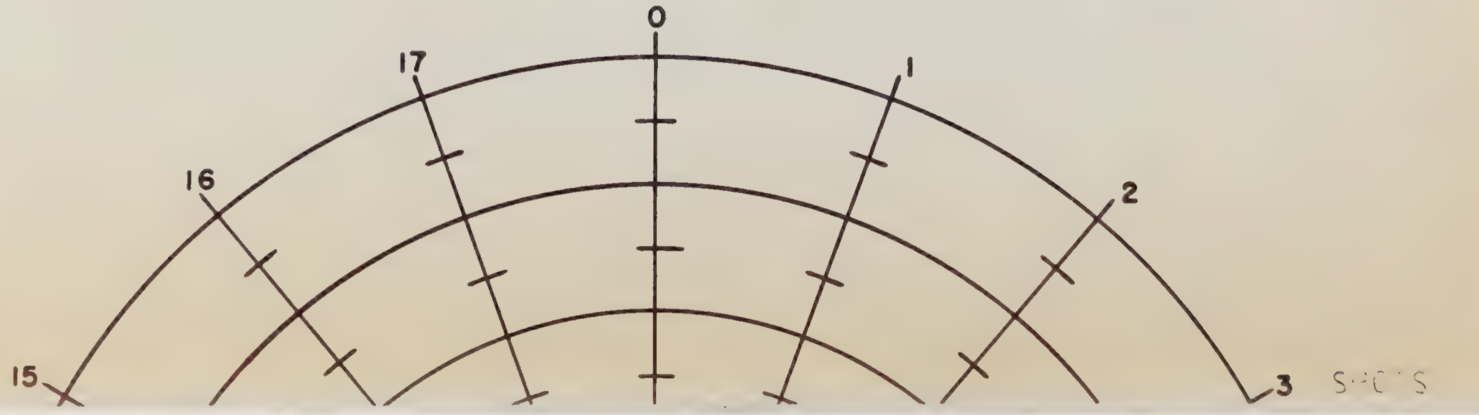


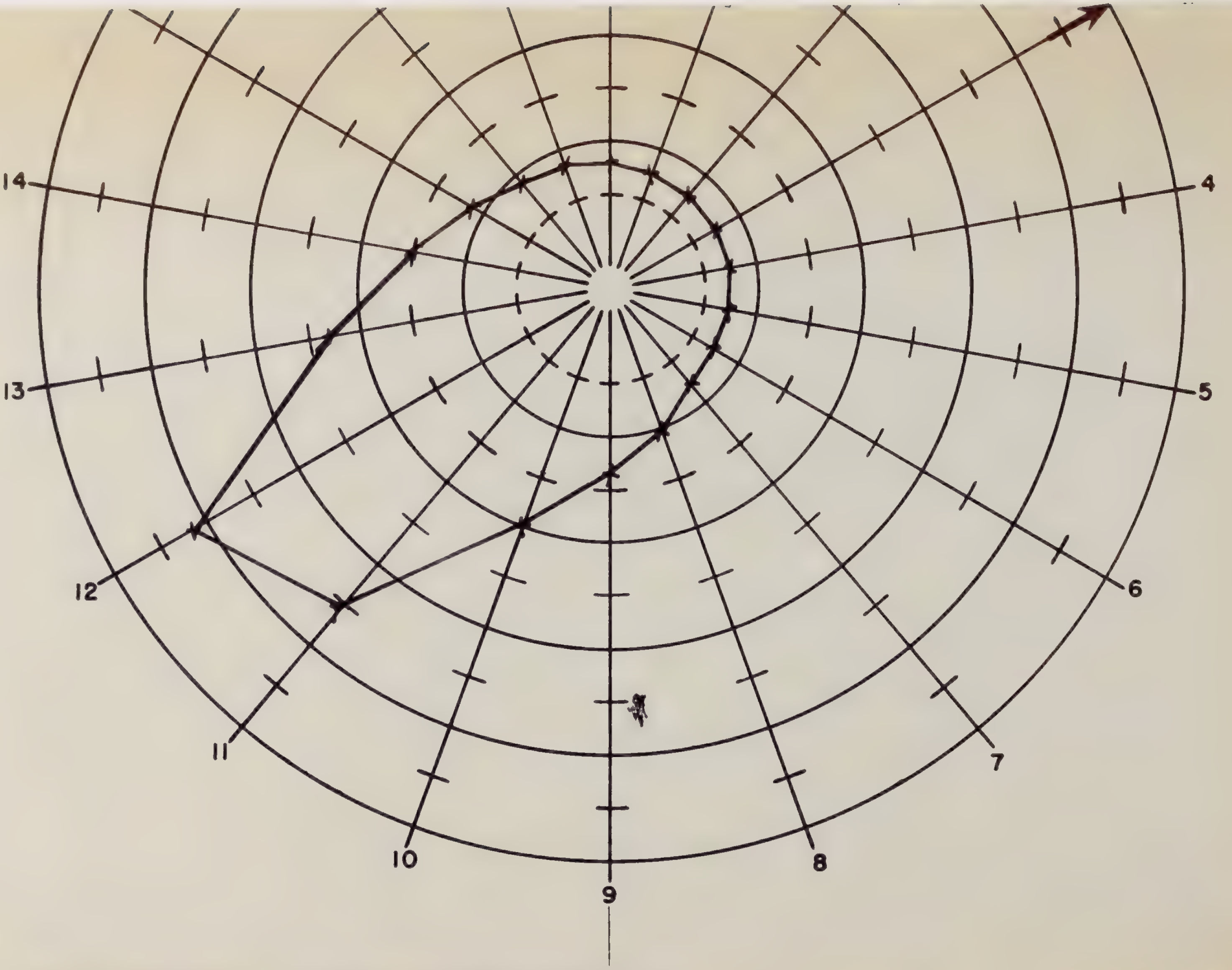


RADIORIENTATION PLOT

POT'-B

NO.1 LONG STRING PERFORATED 1335-1345 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





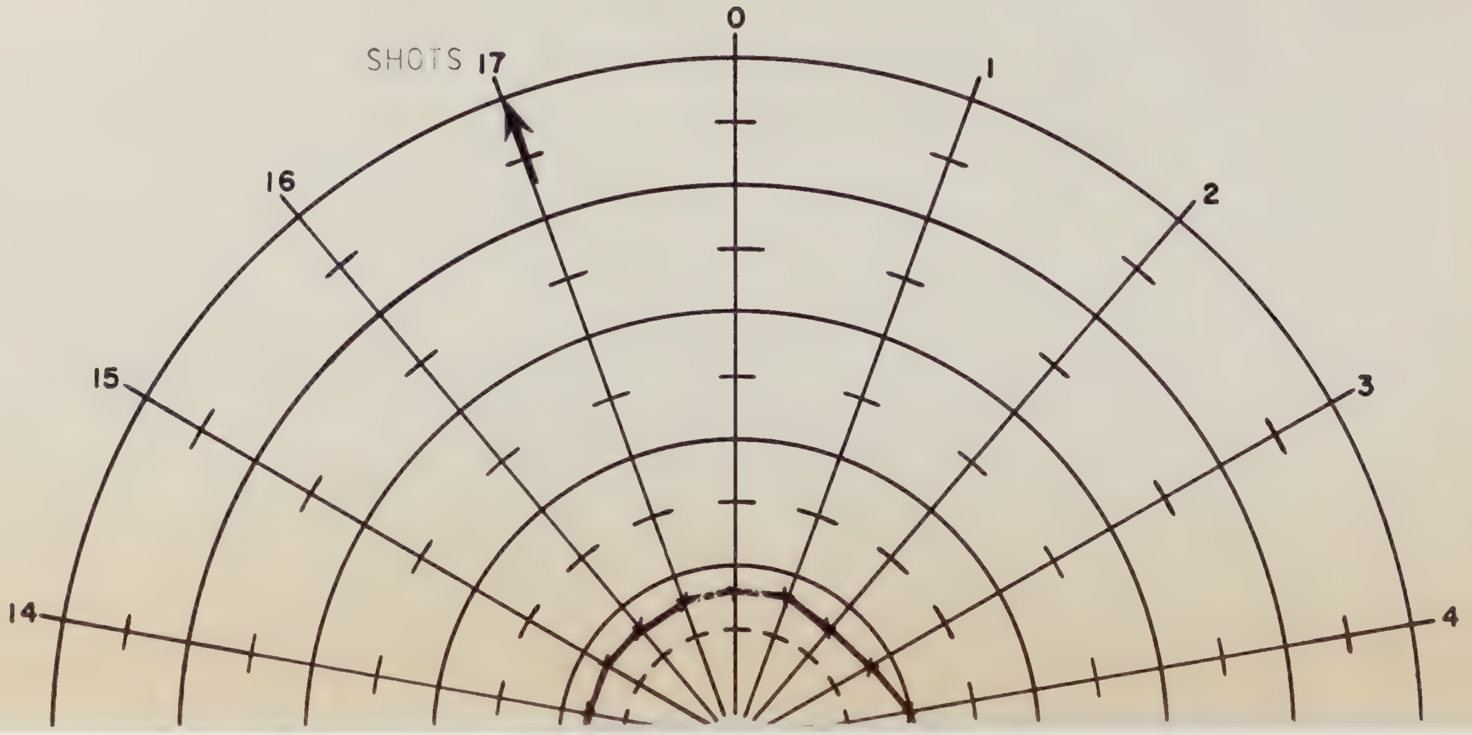
This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by vagrant metal in the

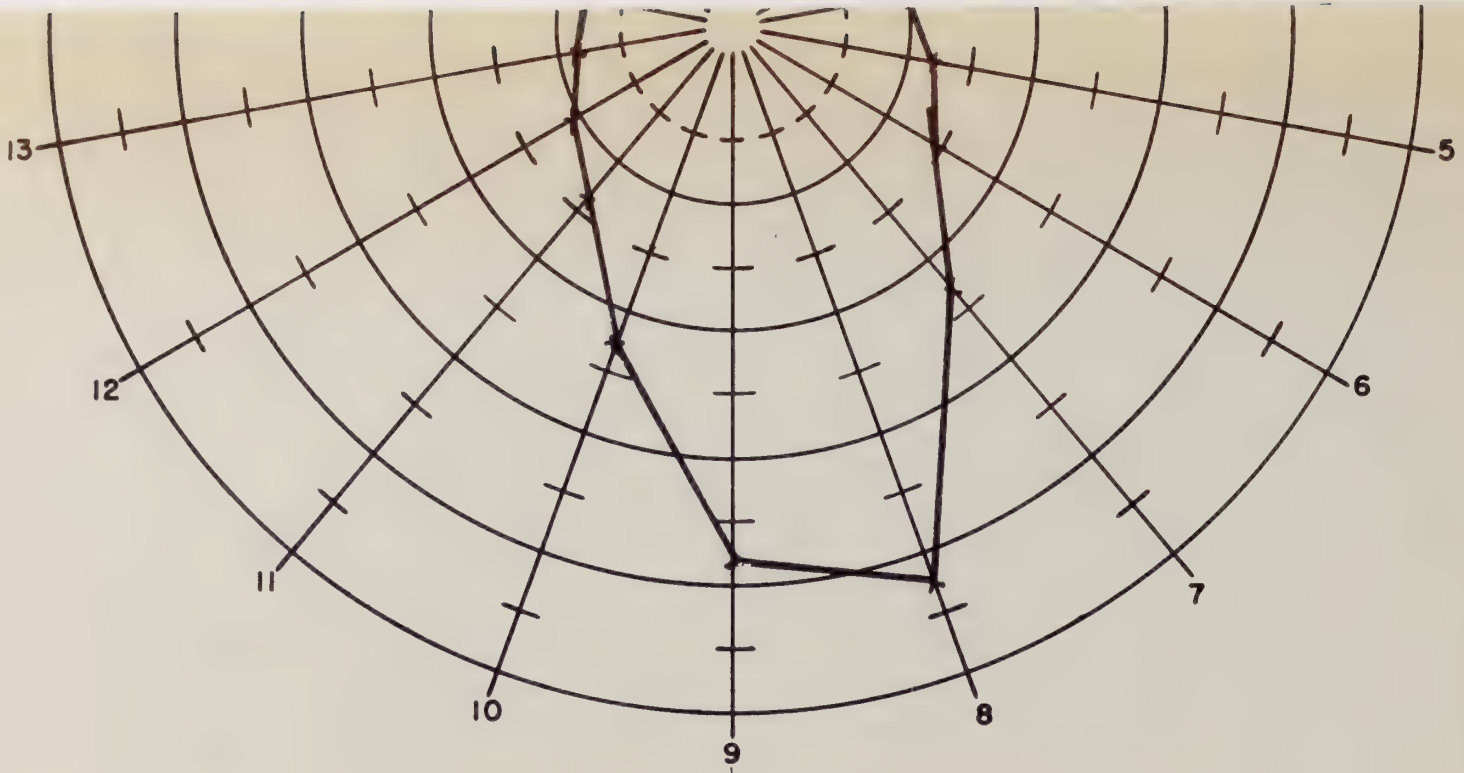
Schlumberger

RADIORIENTATION PLOT

POT-B

NO.1 LONG STRING PERFORATED 1324 1334 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





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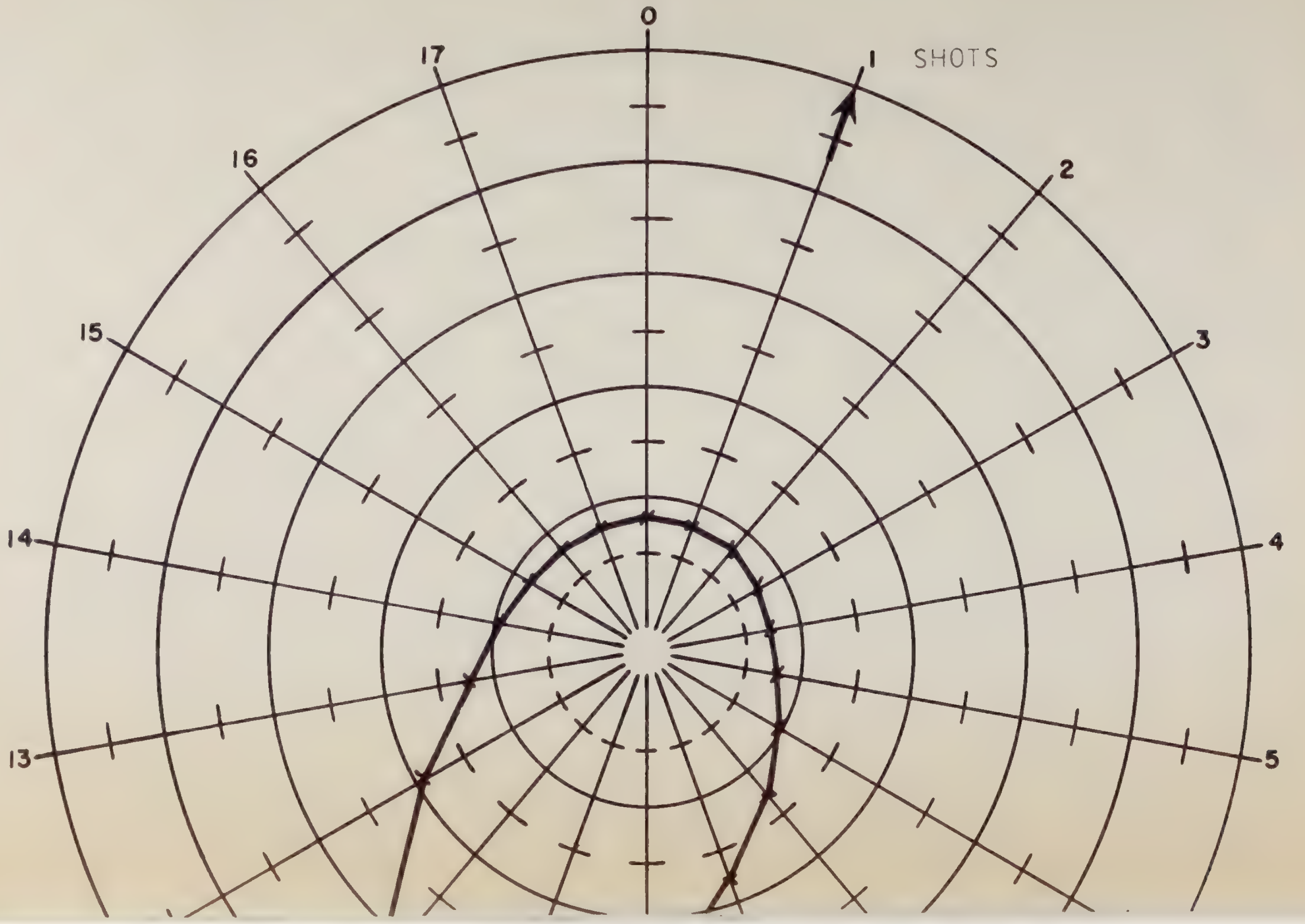
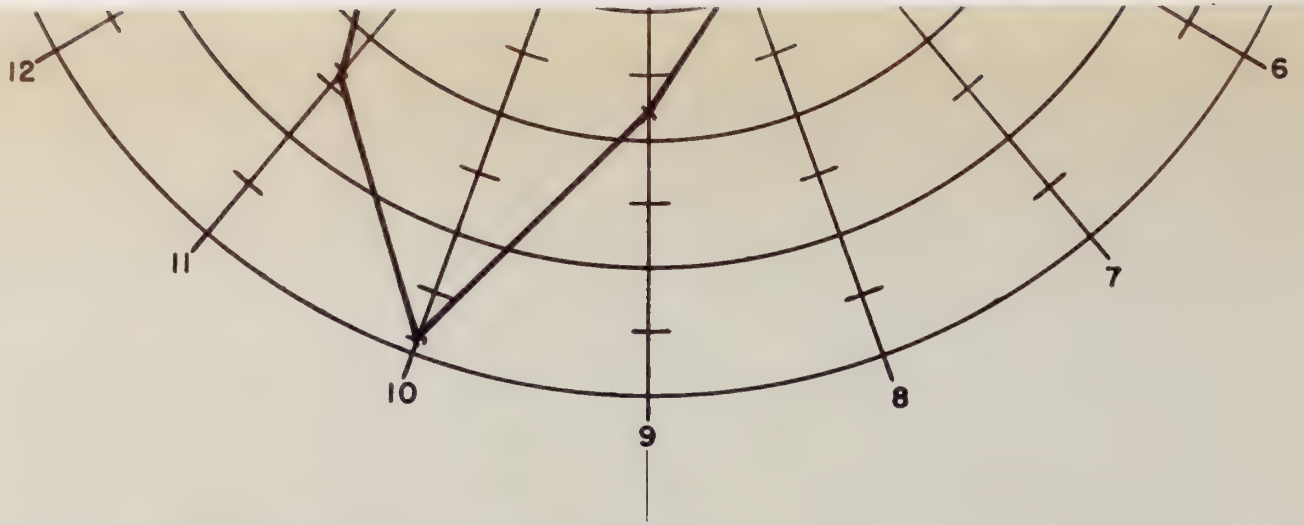
RADIORIENTATION PLOT

POT-B

NO. 1 LONG STRING PERFORATED 1316-1323 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





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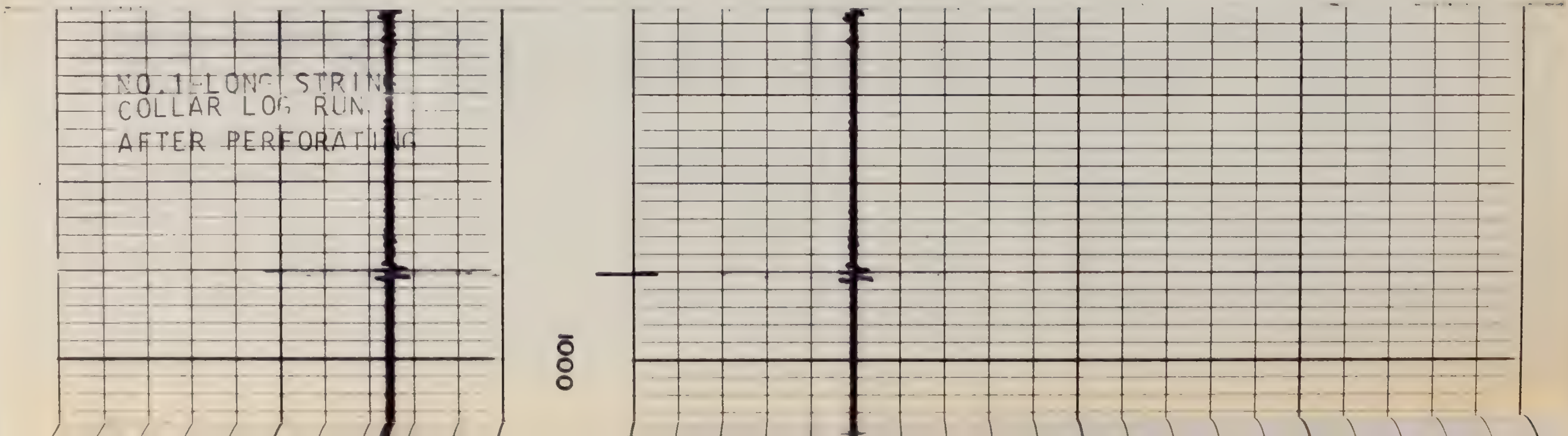
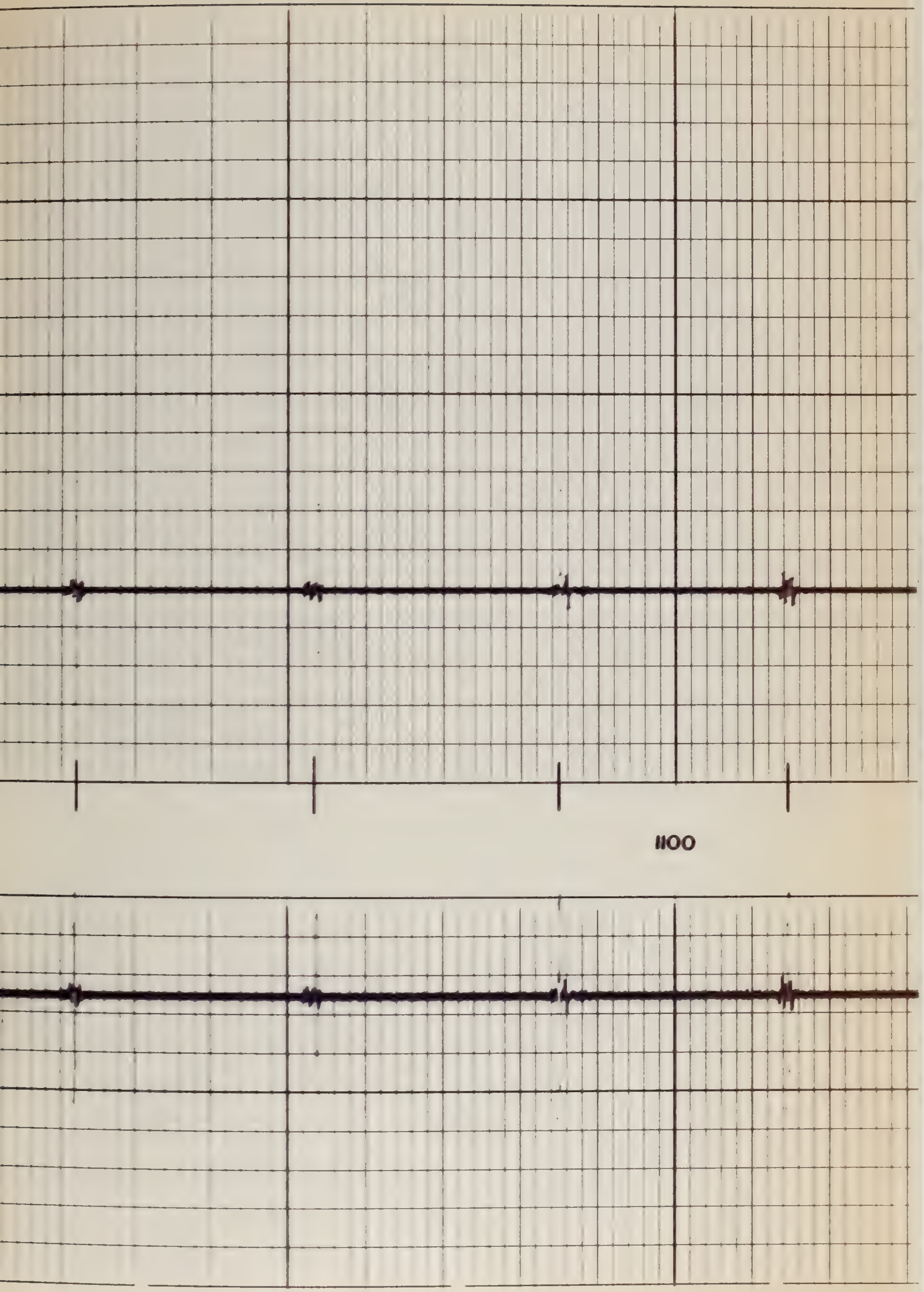
Schlumberger

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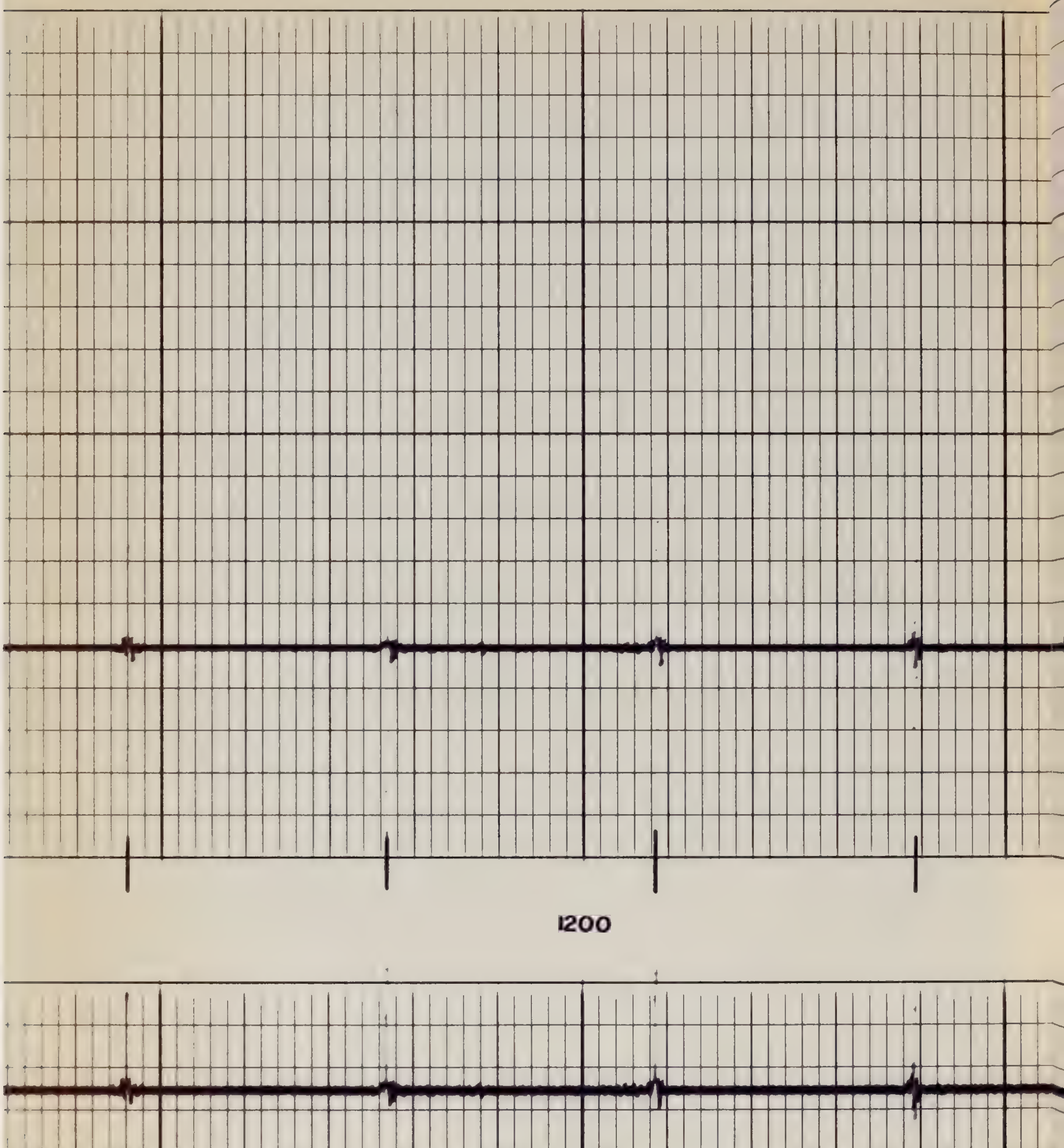
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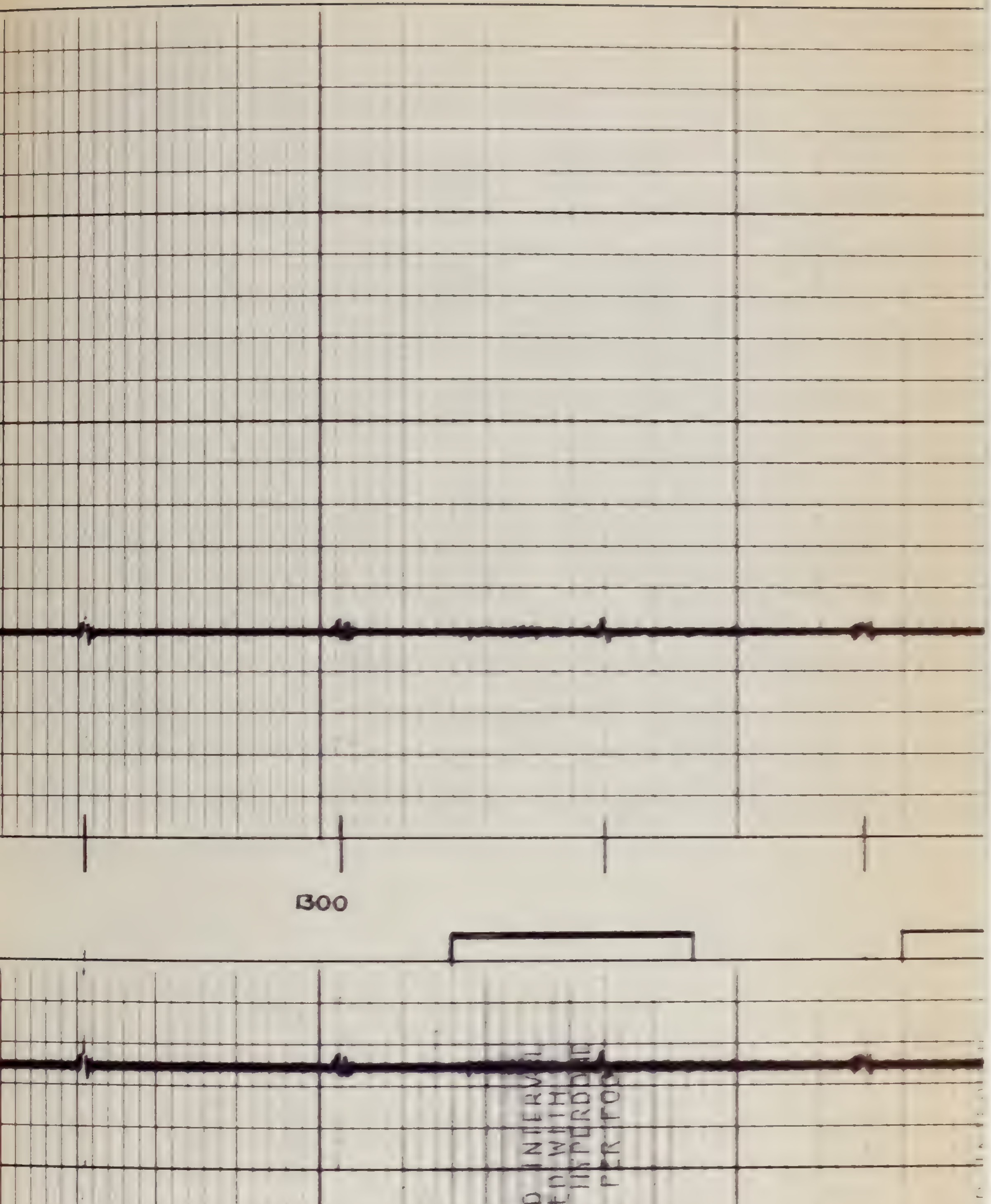
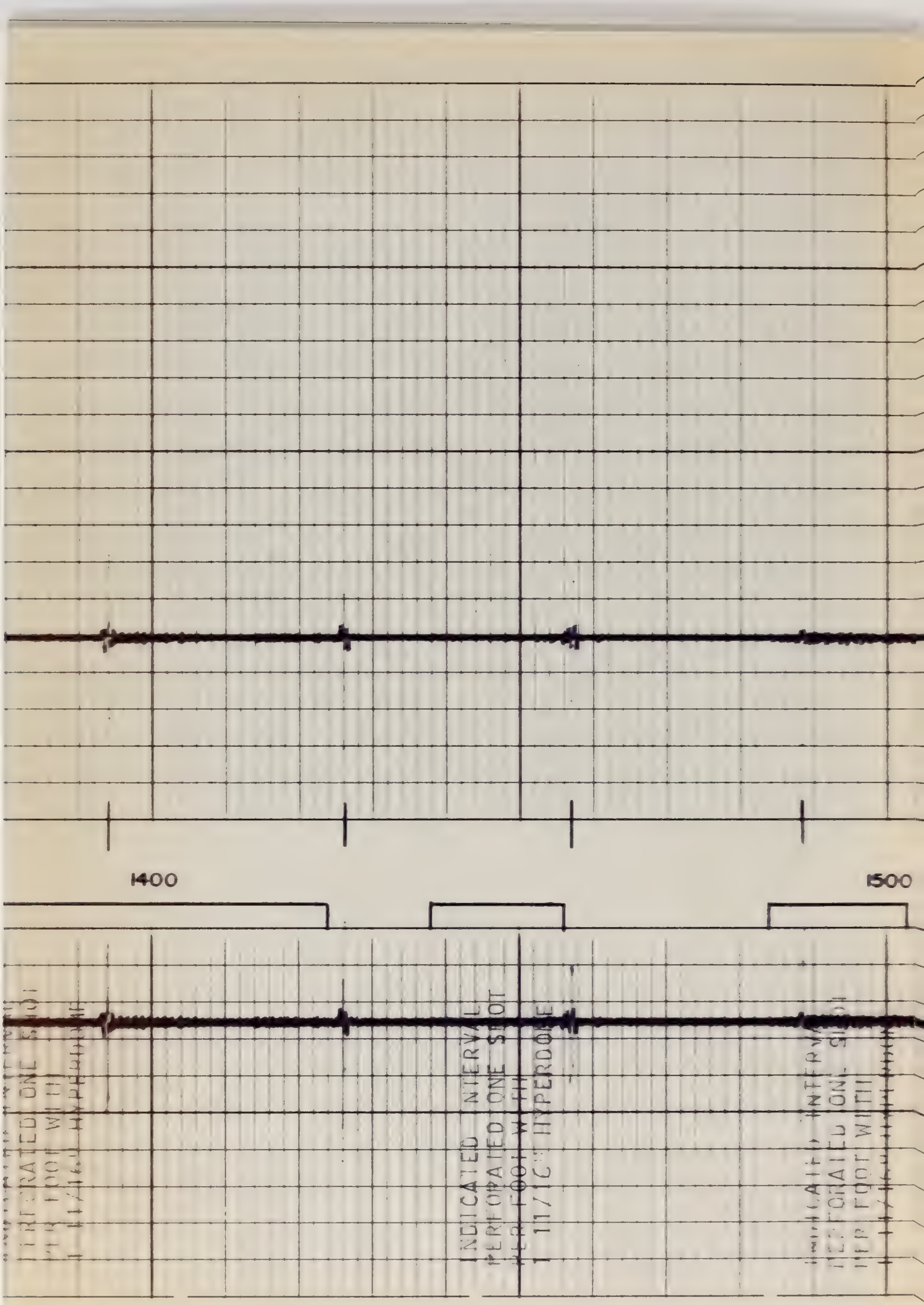
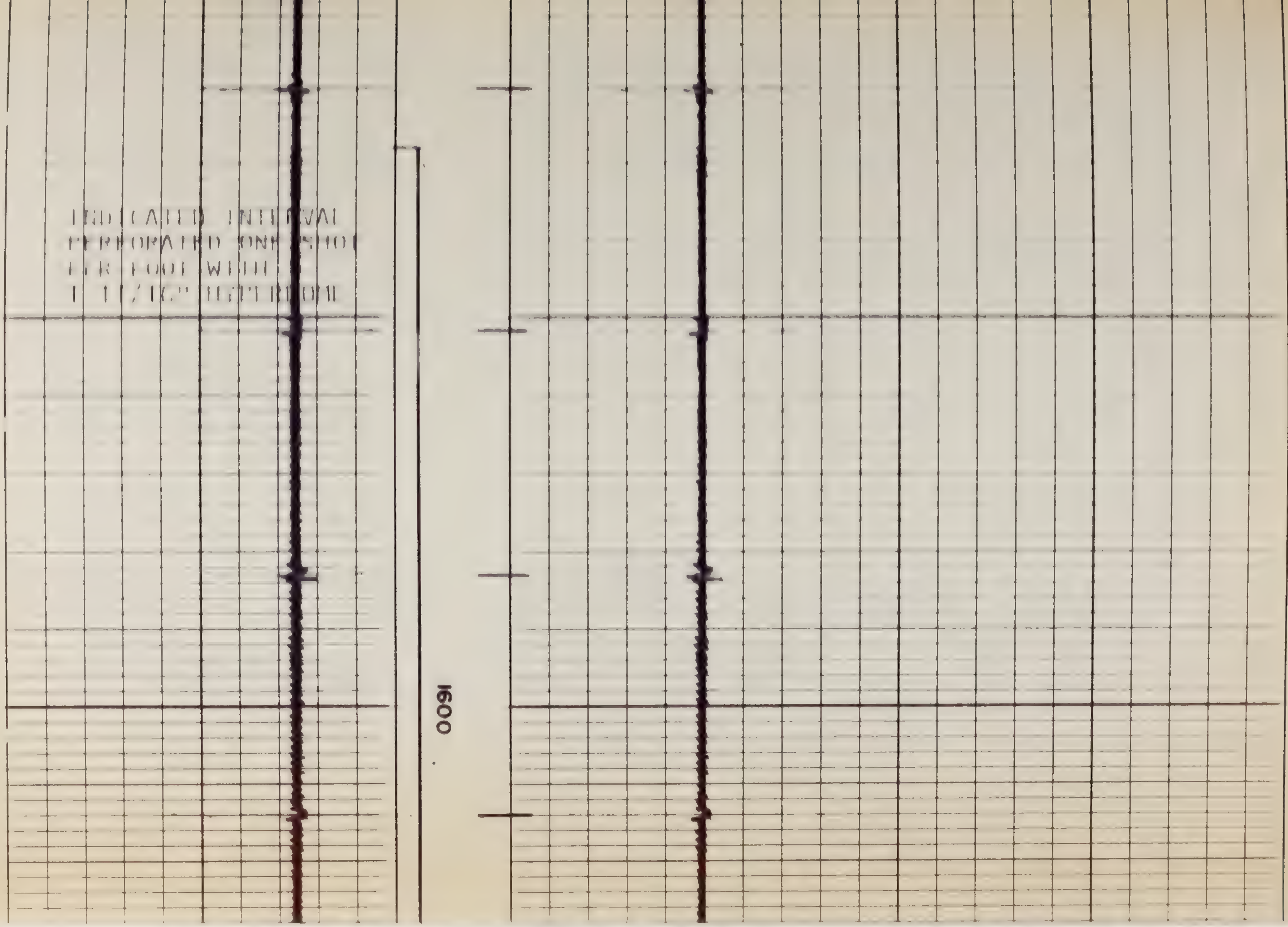
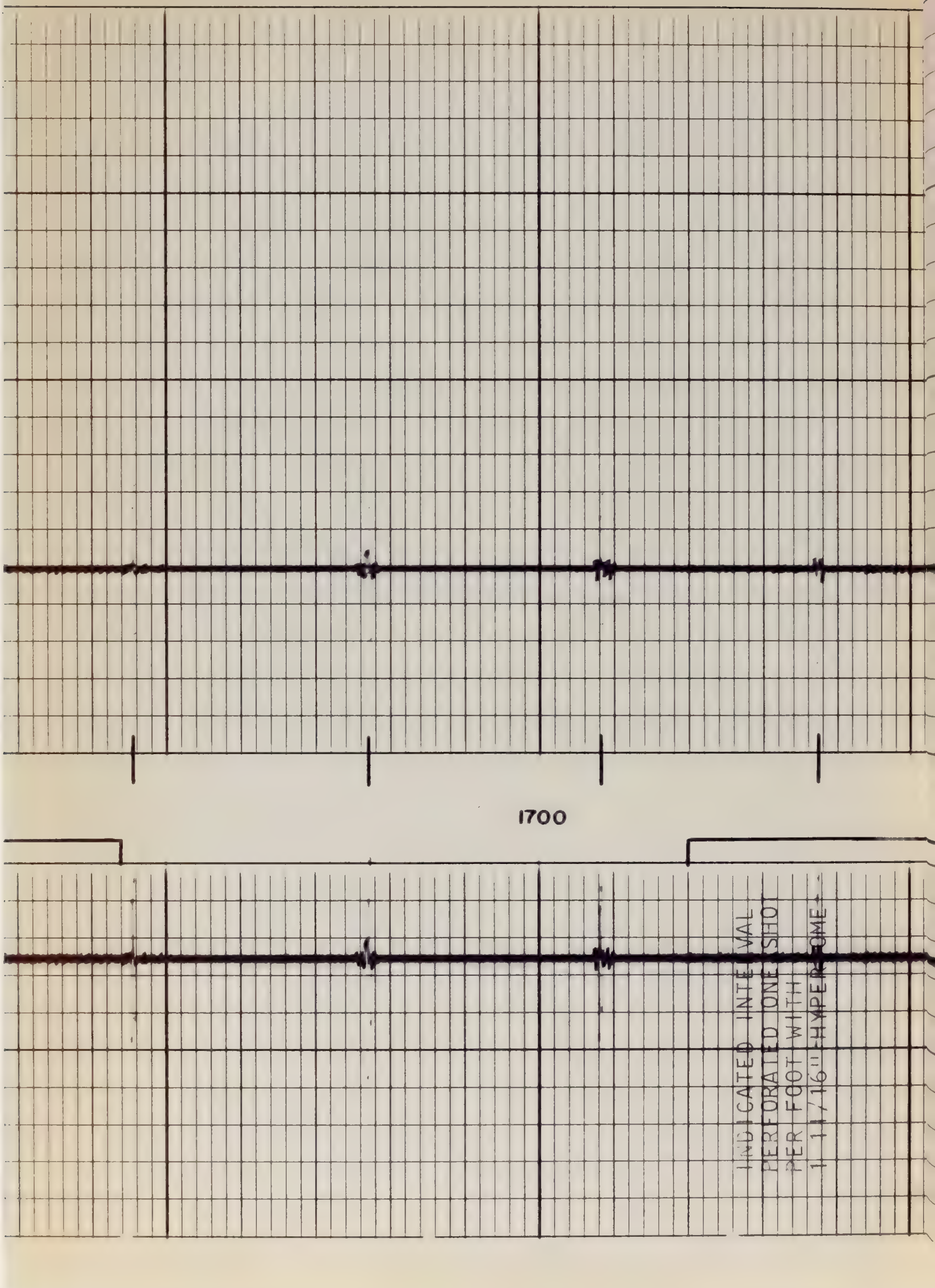
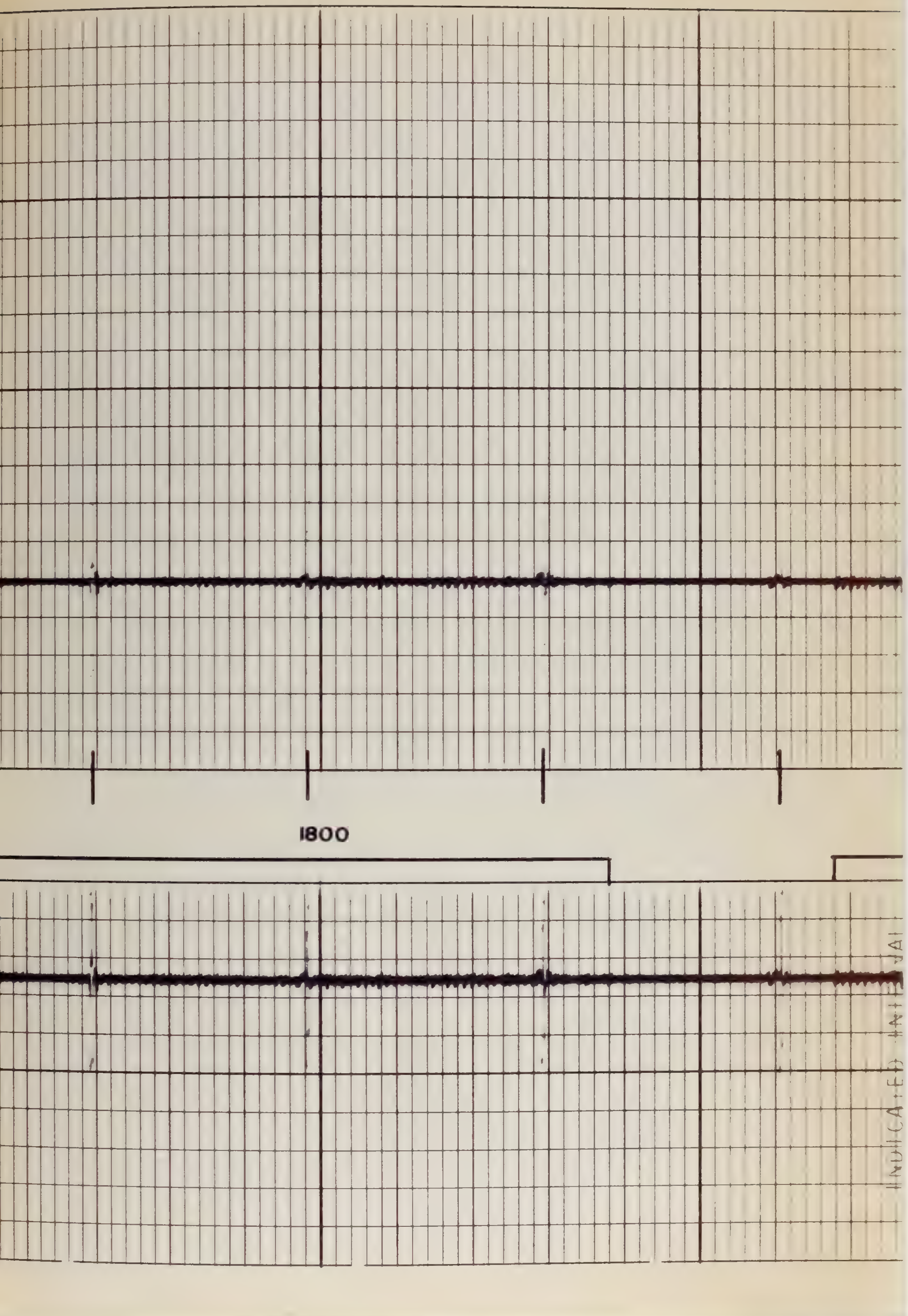
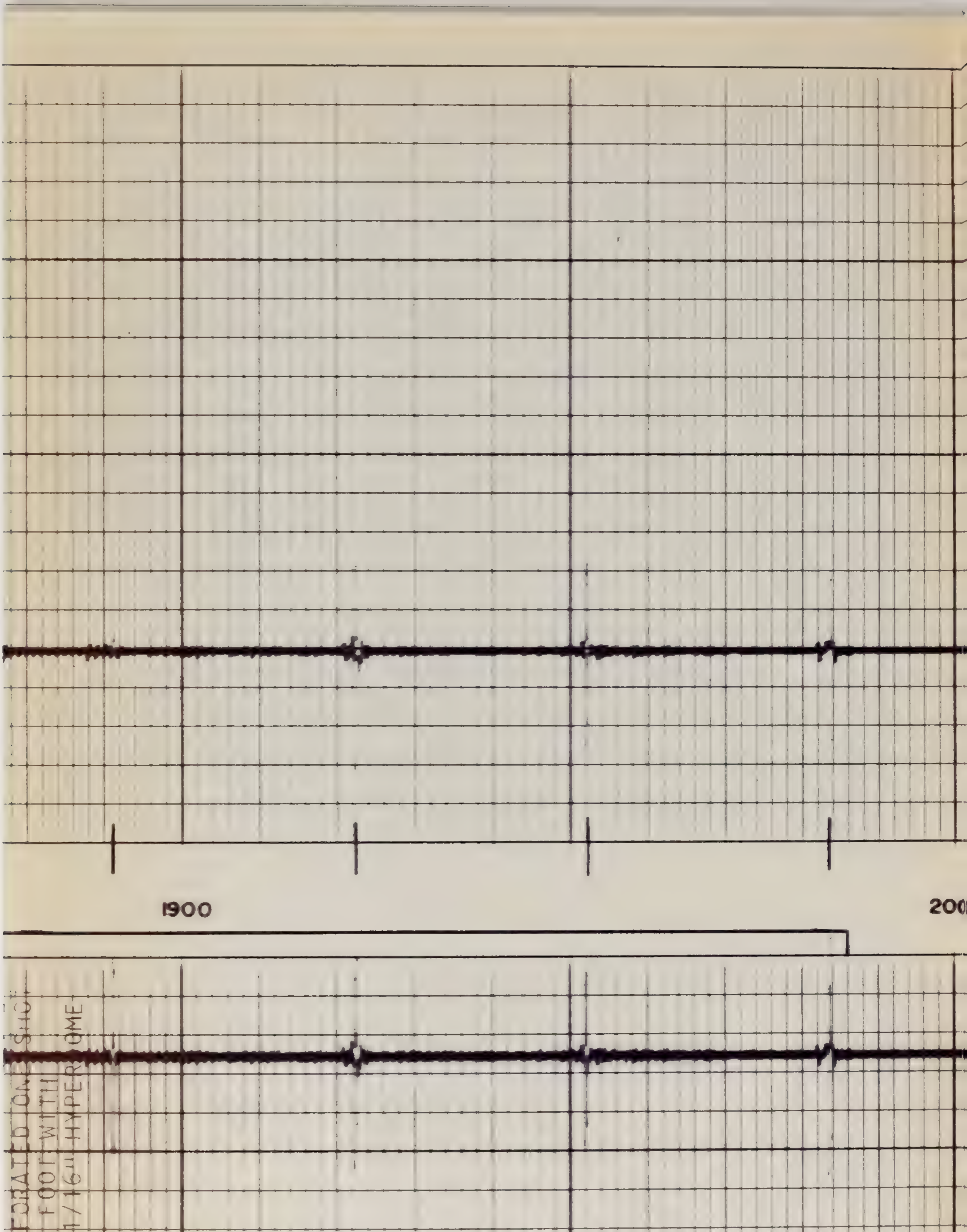

1300
INDICATED INTERVAL
PERFORATED WITH
11/16" UNPERFORATED
ONE SHOT PER FOOT

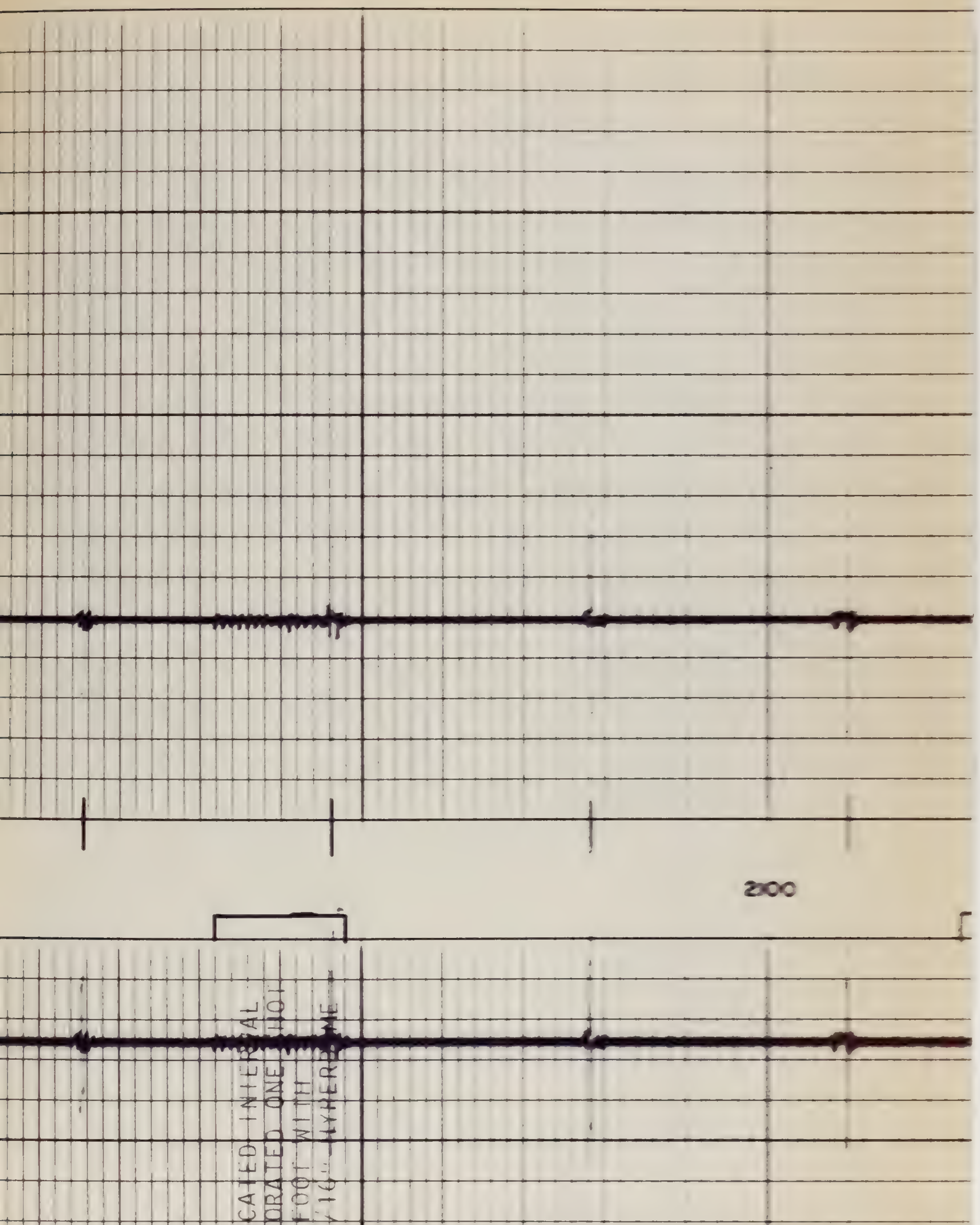

1400
1500
PERFORATED ONE SHOT
PER FOOT WITH
1 11/16" HYPERDOME
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH
1 11/16" HYPERDOME
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH

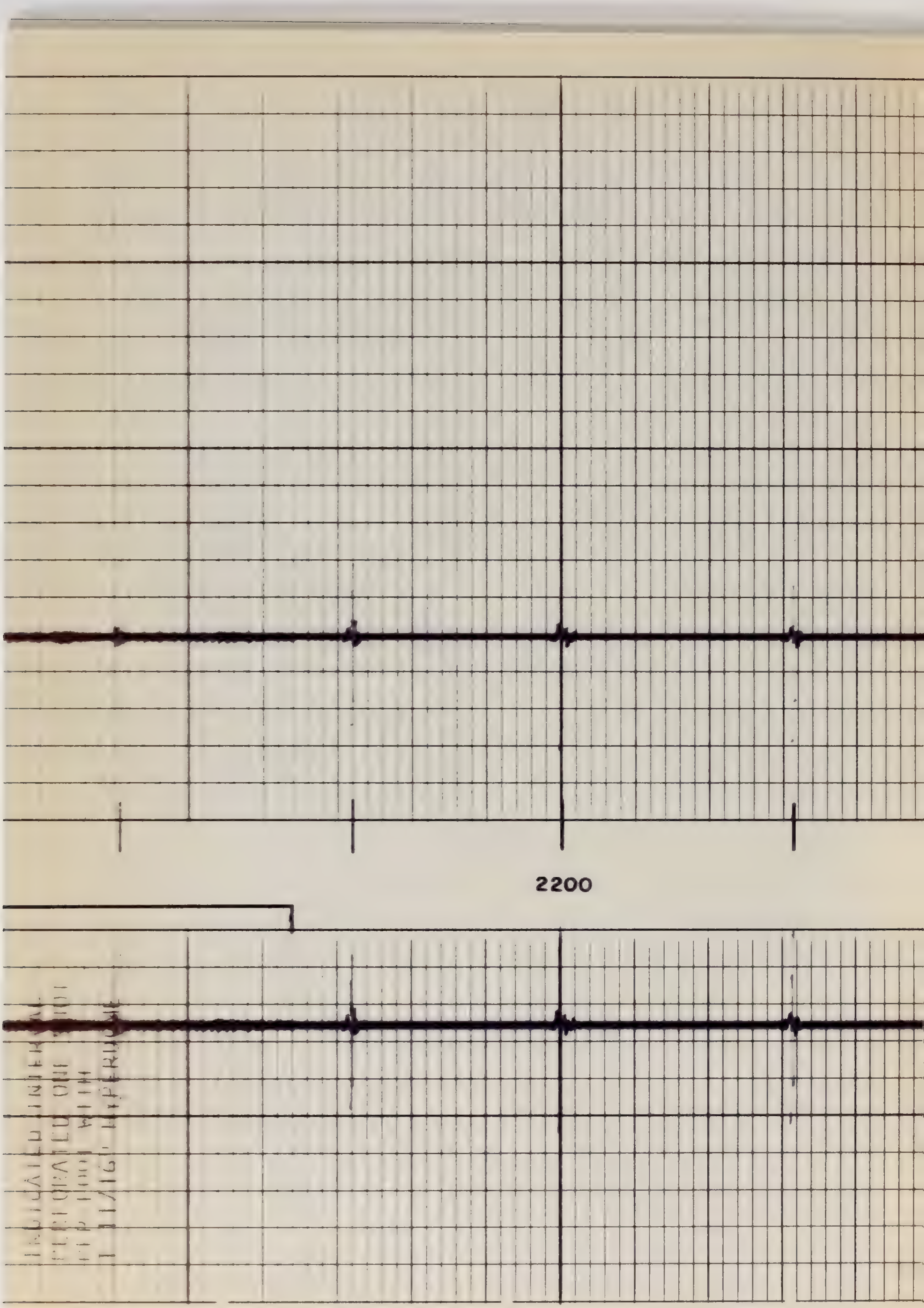

INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH
1 11/16" JETTRON
1600

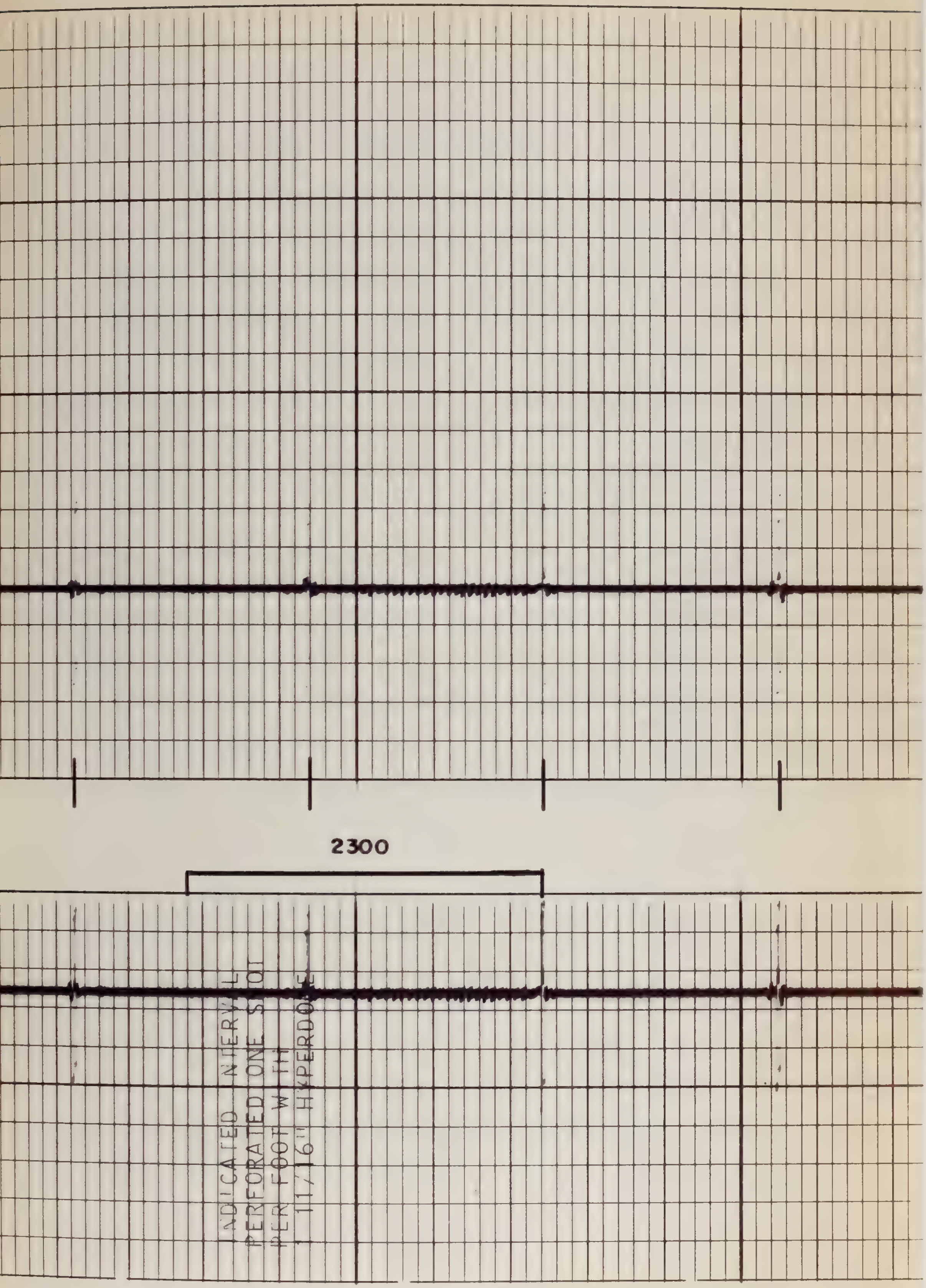

1700
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH
1 11/16" HYPER-DOME

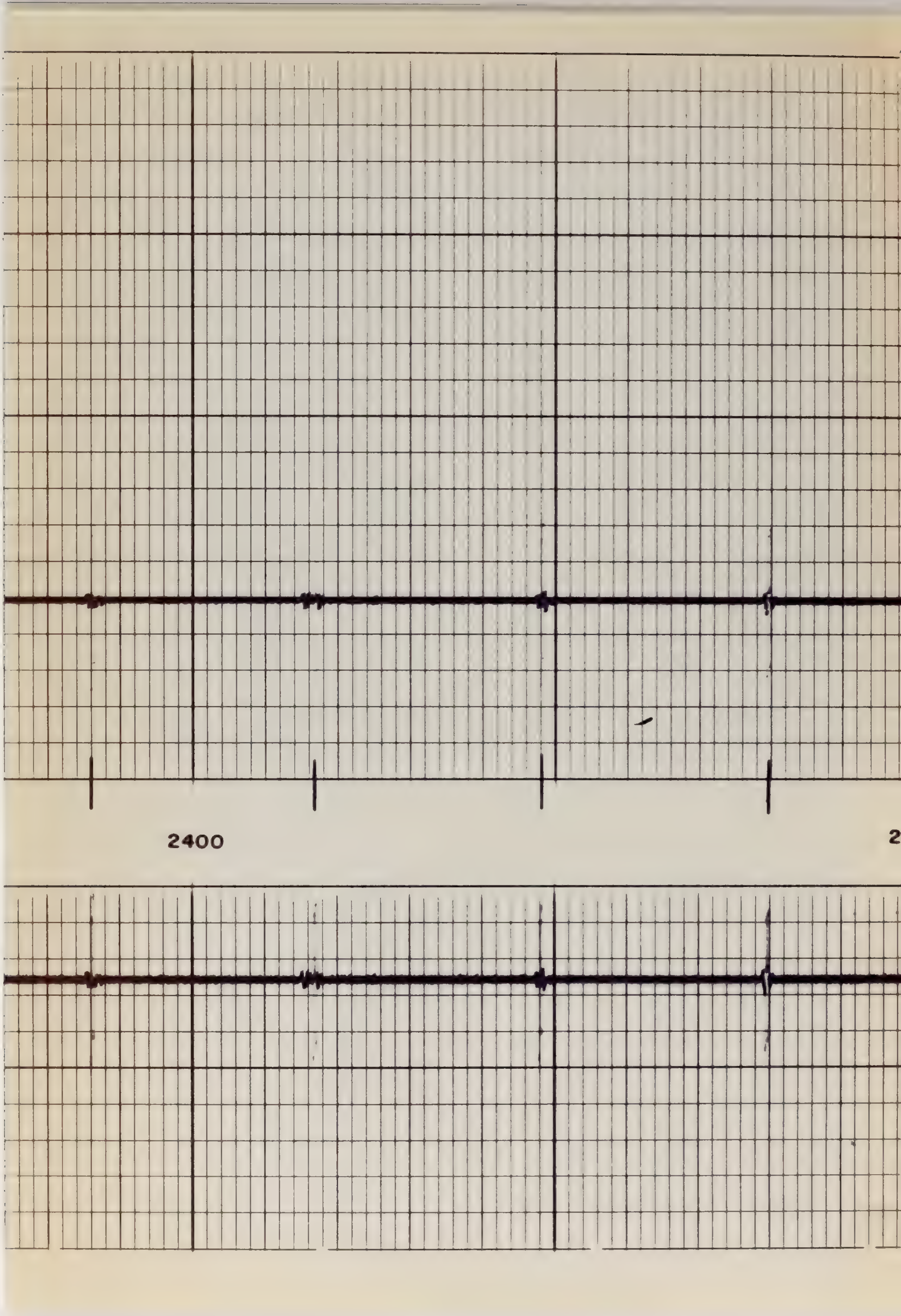

1800
INDICATED INTERVAL

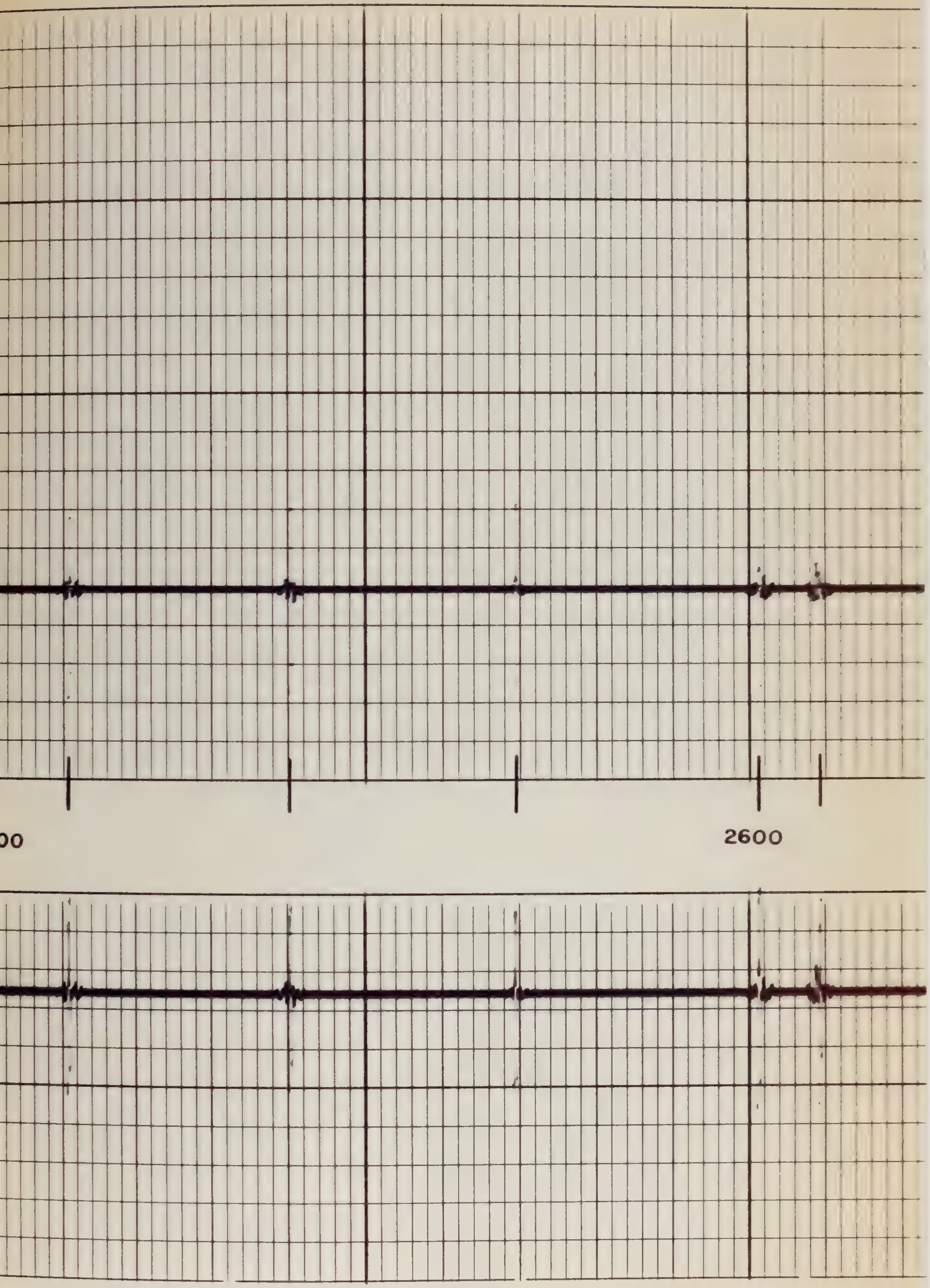

1900
200
PERFORATED ONE SHOT
PER FOOT WITH
1 11/16" HYPERDOME

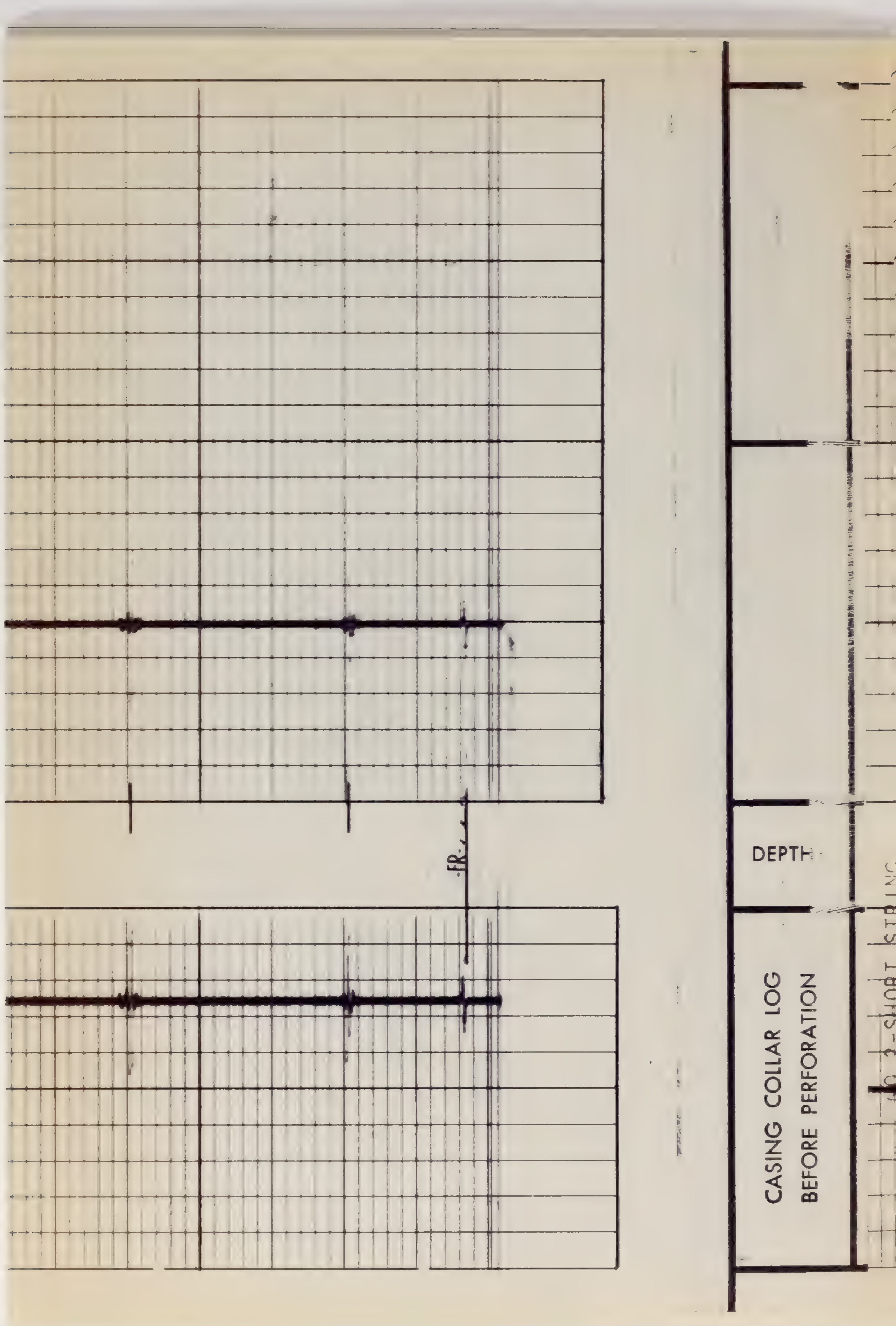

2100
INDICATED INTERVAL
PERFORATED ONE HOLE
PER FOOT WITH
1 11/16" HYPERJET

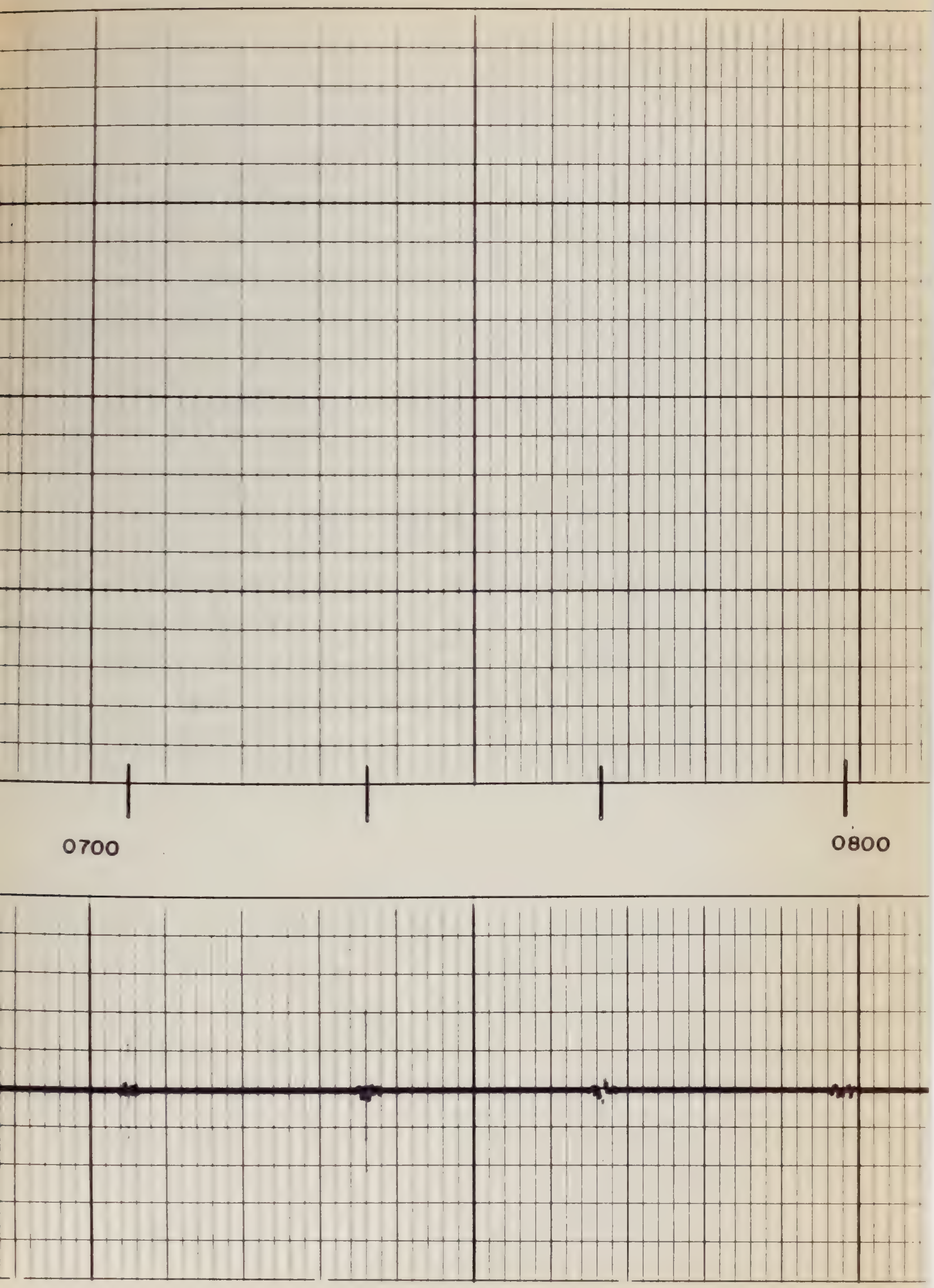

2200
INDICATED INTERVAL
PERFORATED ON

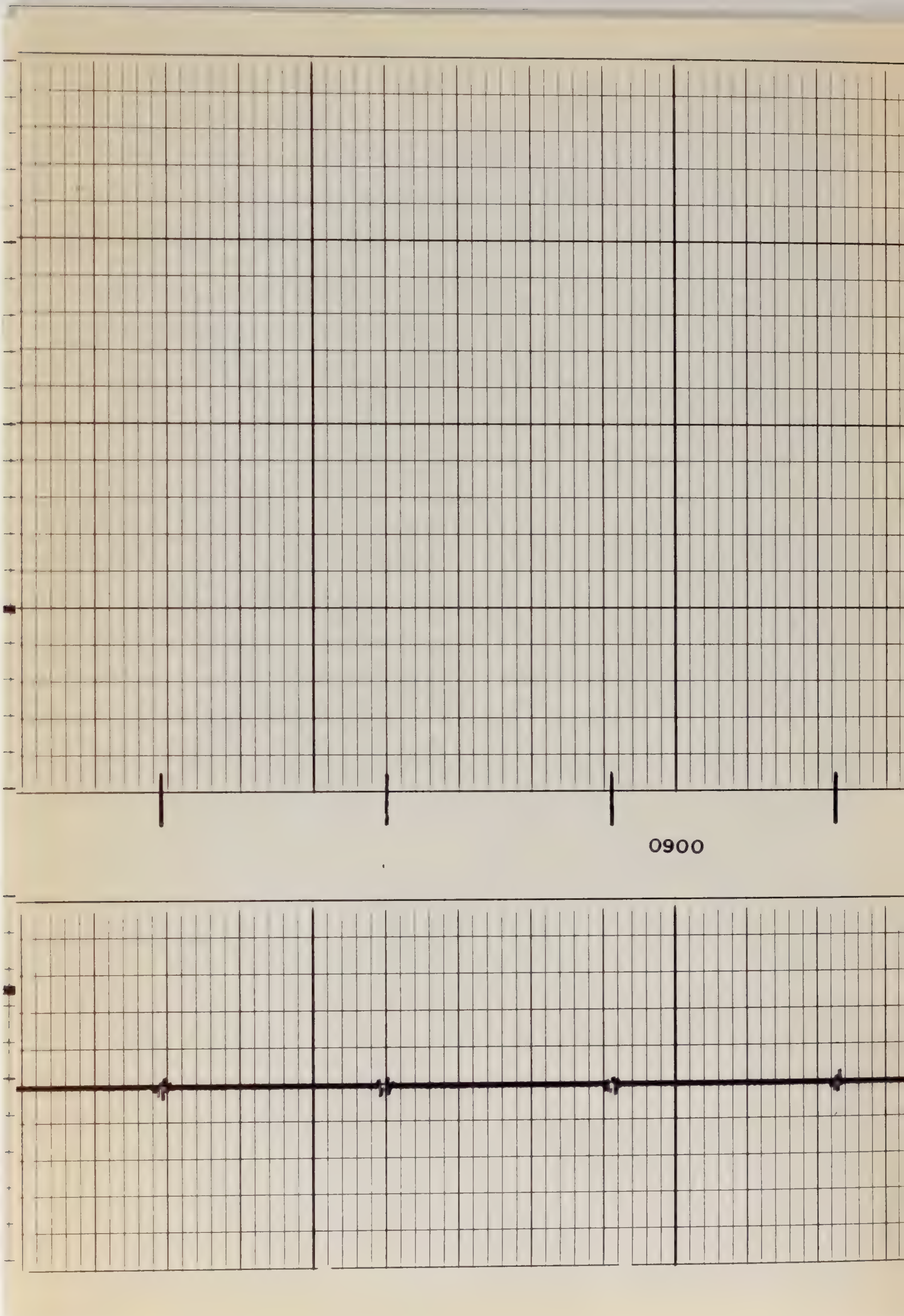

2300
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH
11/16" HYPERDOME


2400
2


00
2600


CASING COLLAR LOG
BEFORE PERFORATION
DEPTH
FR
2-SHORT STRING


0700
0800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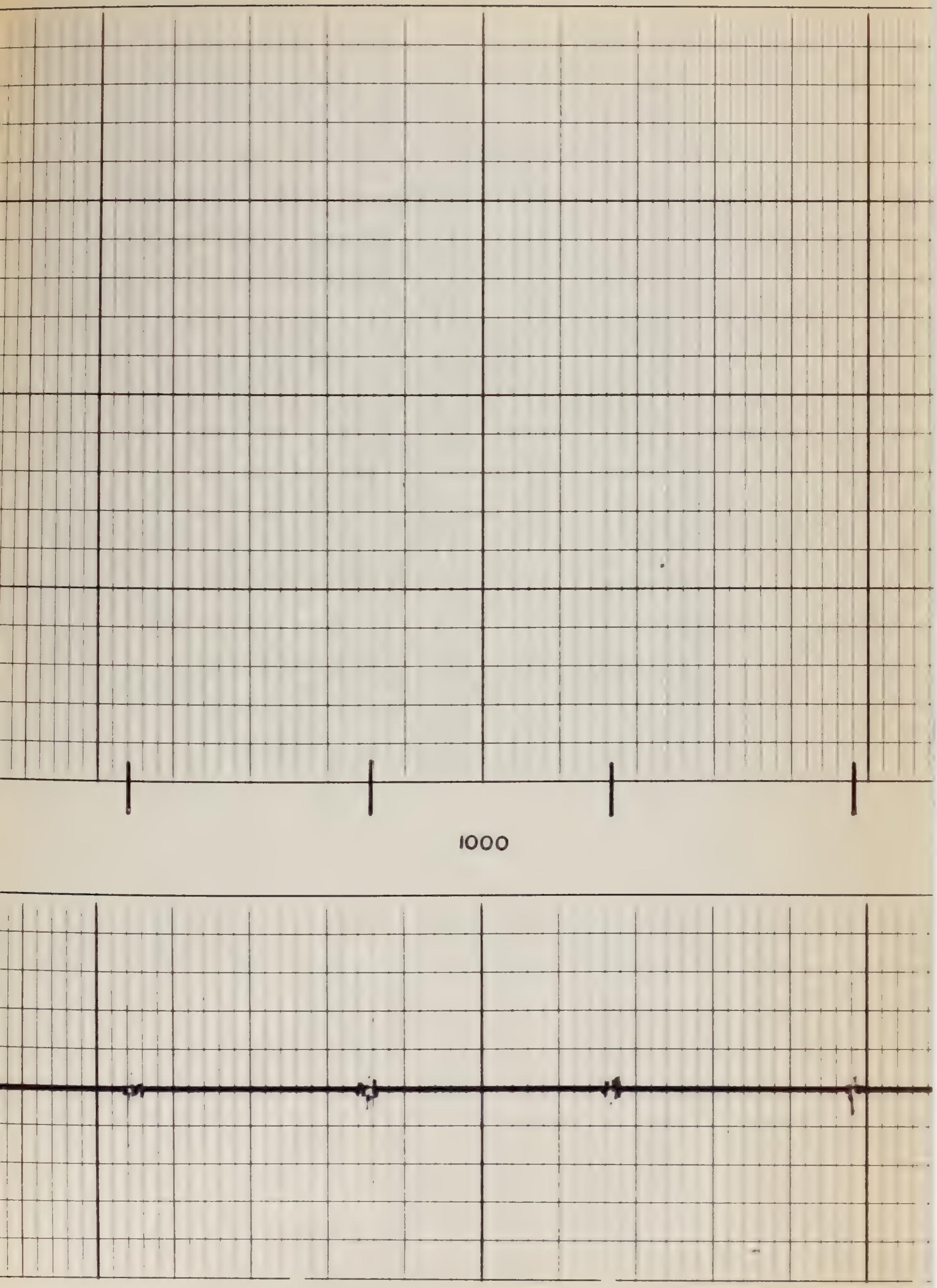
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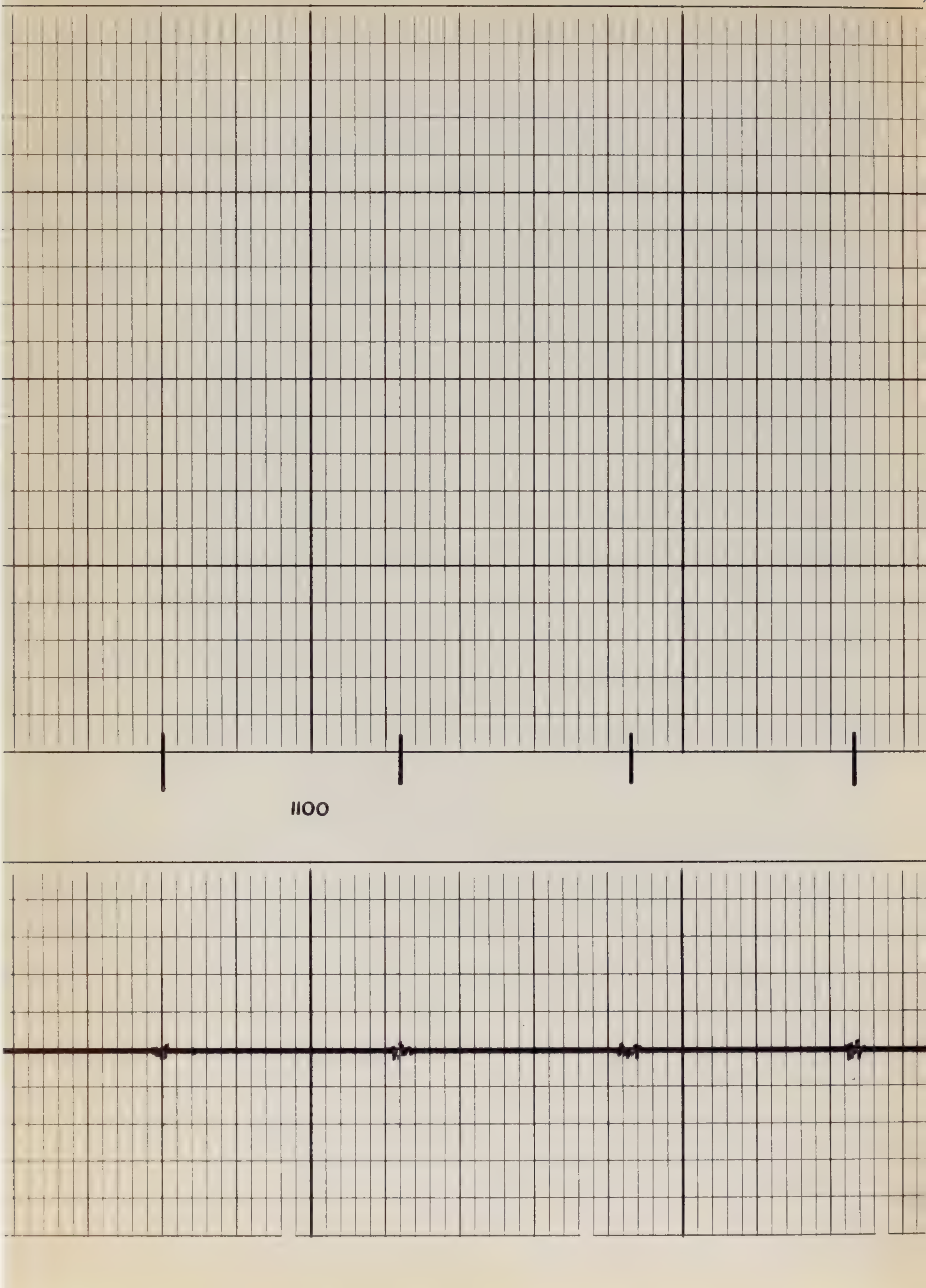
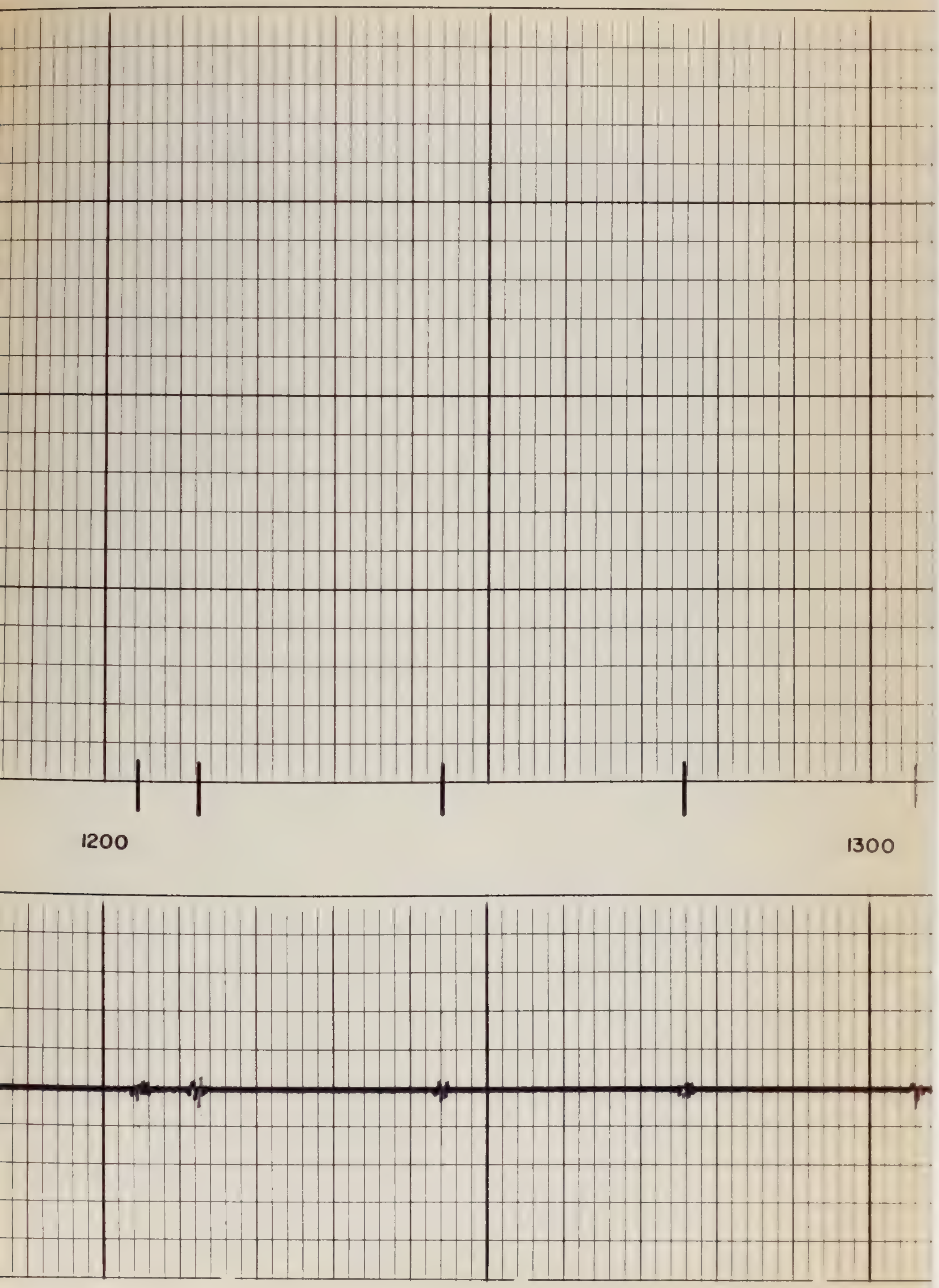
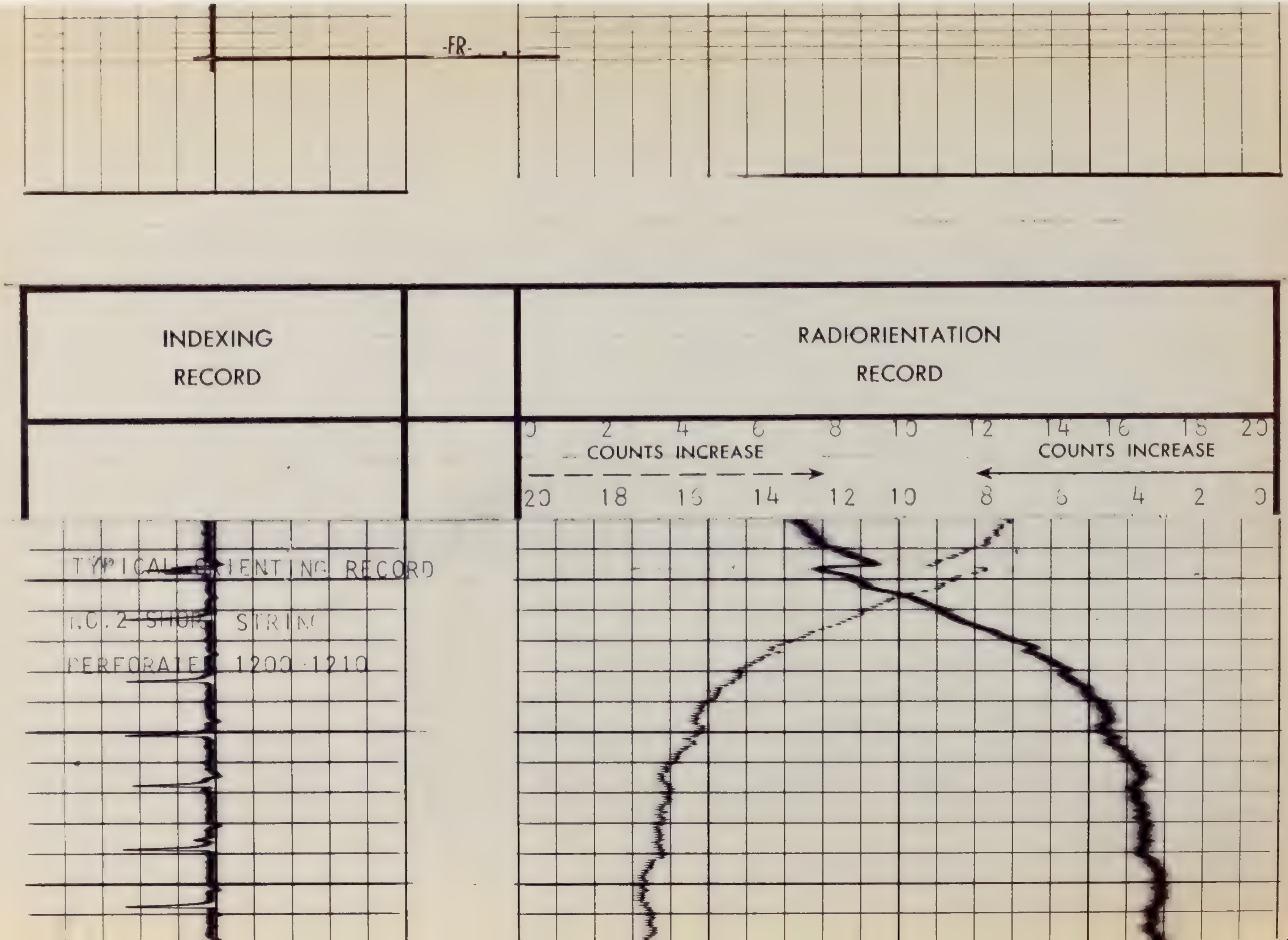

1100

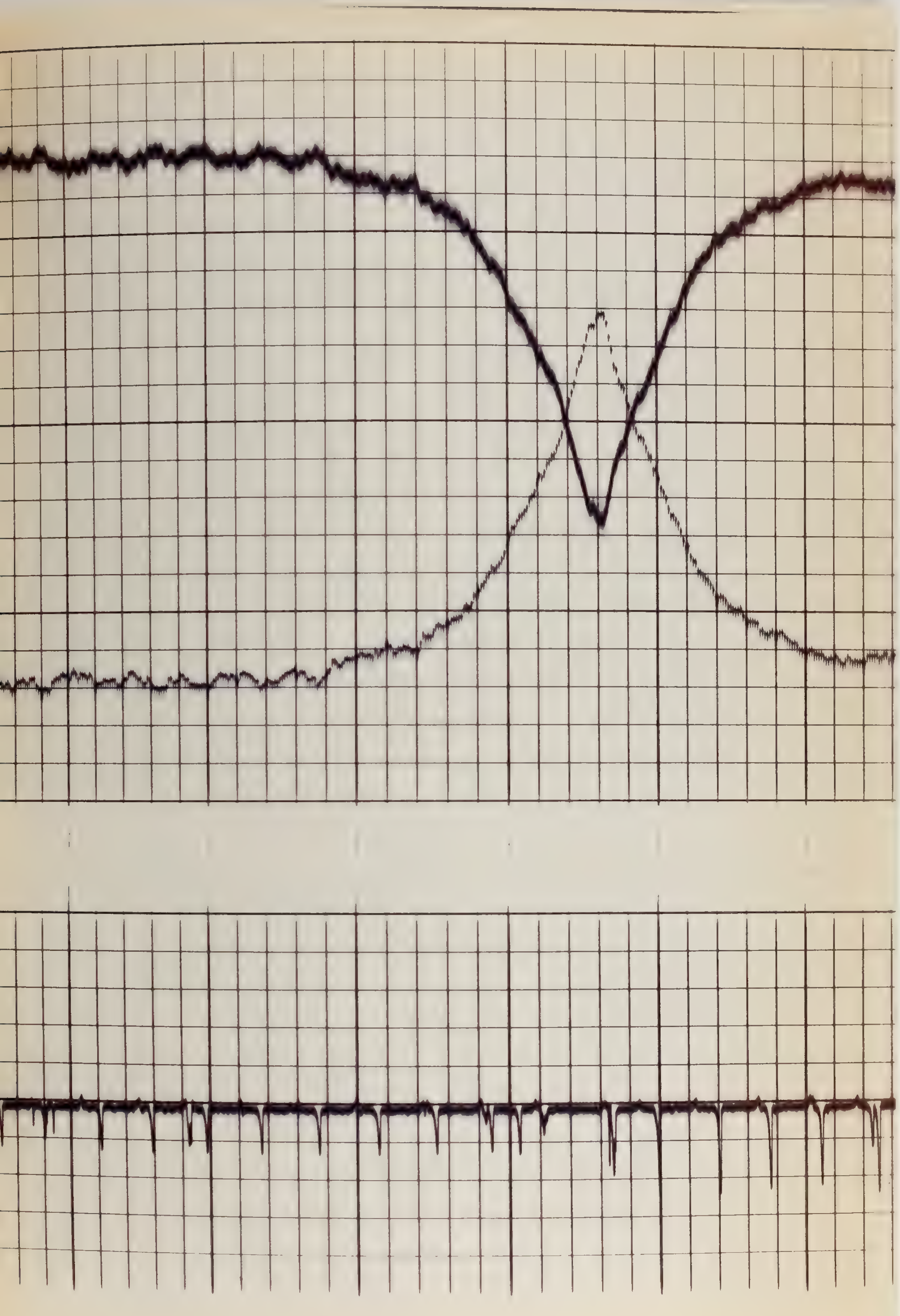

1200
1300

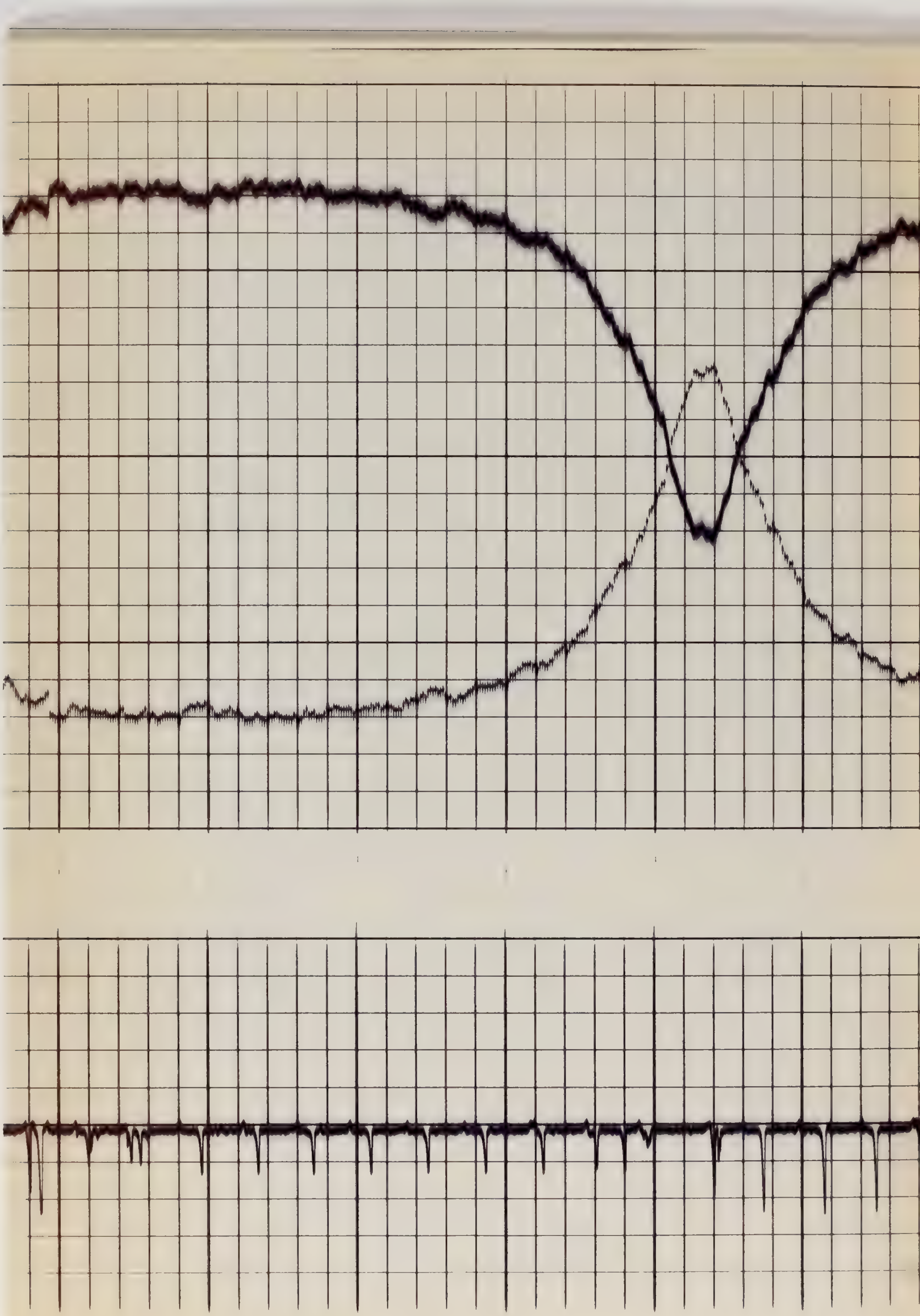


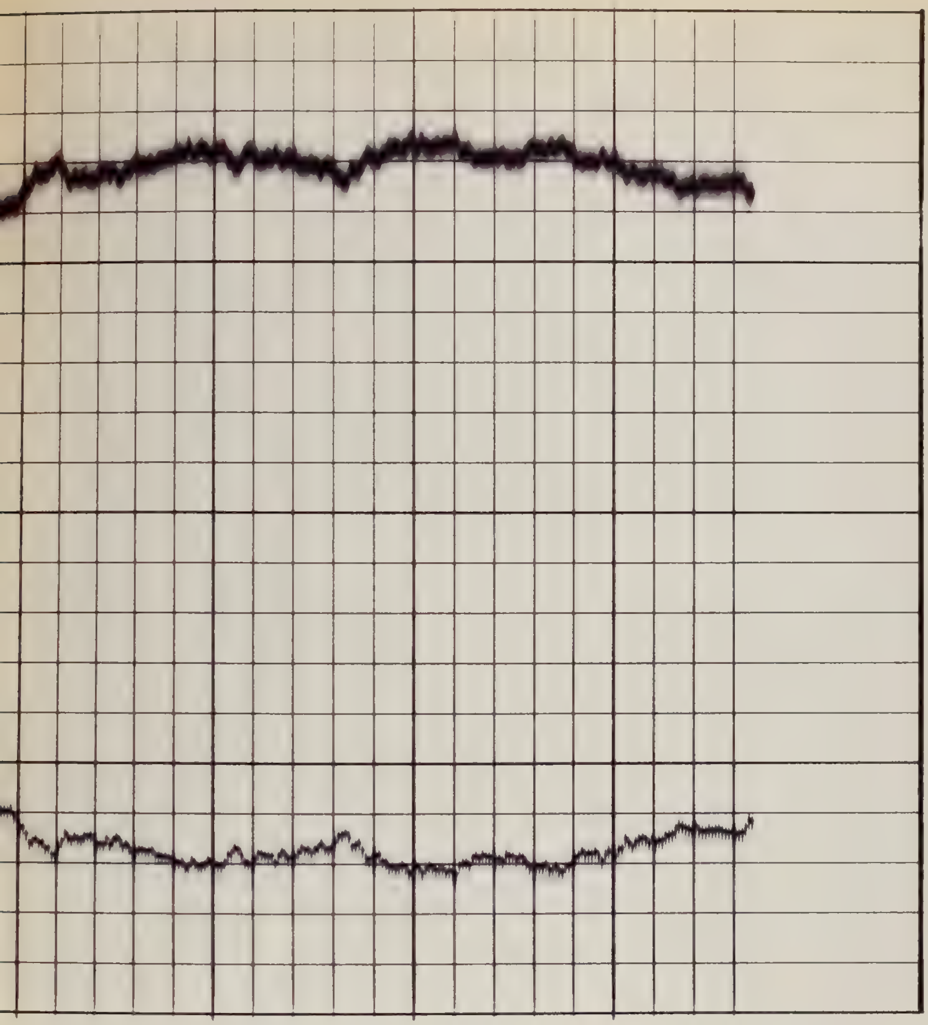
TYPICAL ORIENTING RECORD

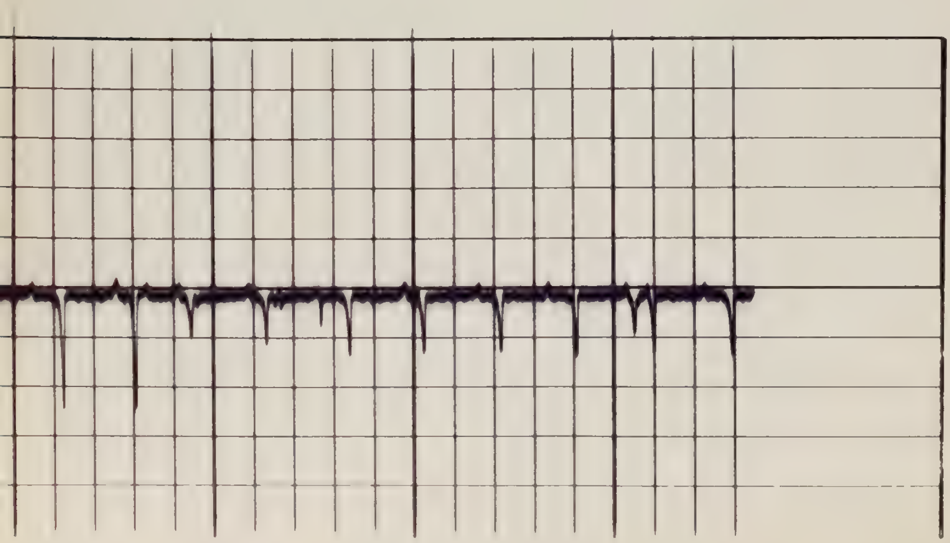
T.C. 2 SHOT STRING

PERFORATED 1200-1210





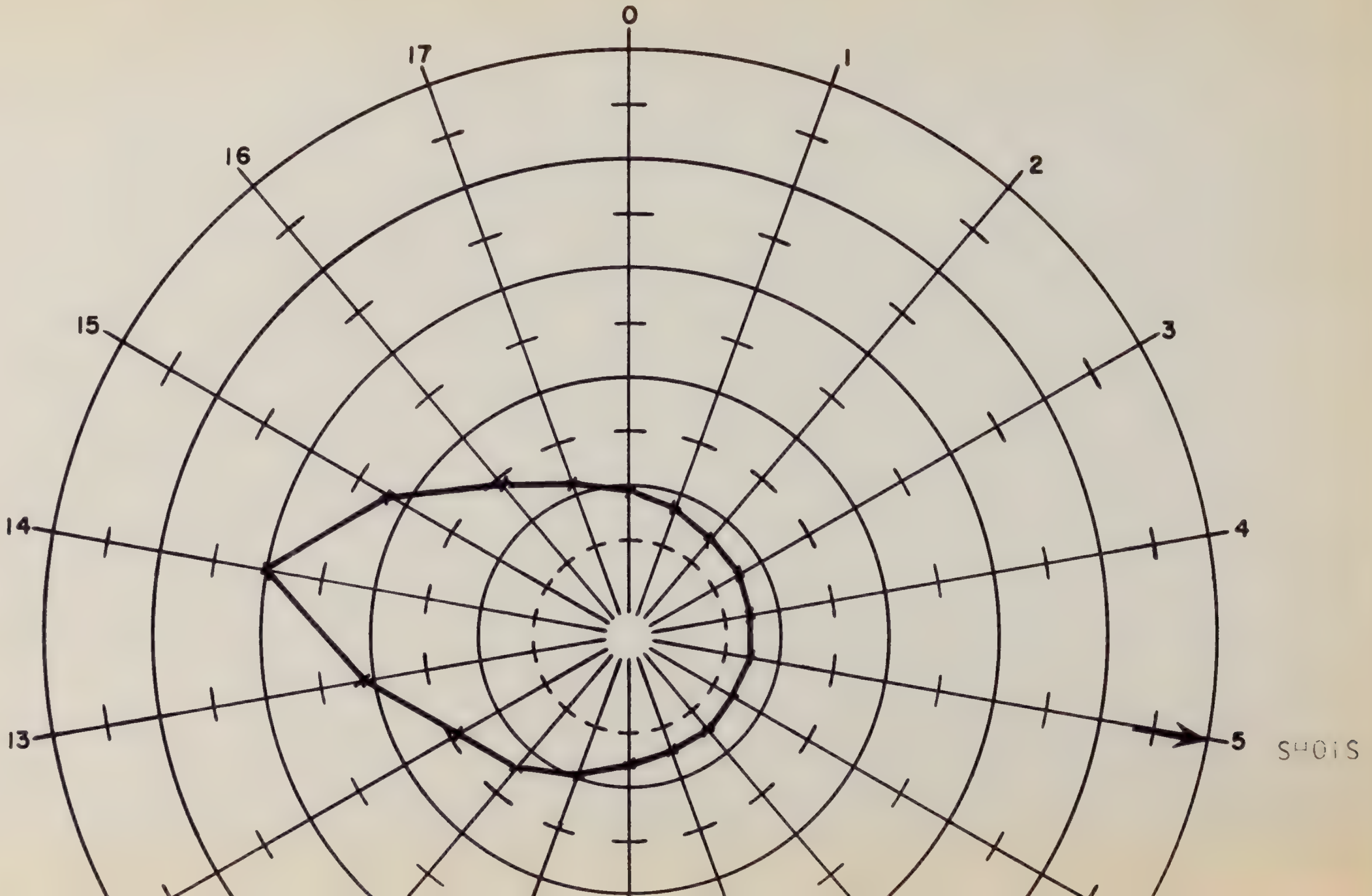




RADIORIENTATION PLOT

POT-B

NO.2 S-CPT STRING PERFORATED 1200-1210 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME



12
6
11
7
10
8
9

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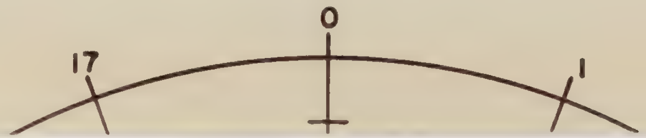
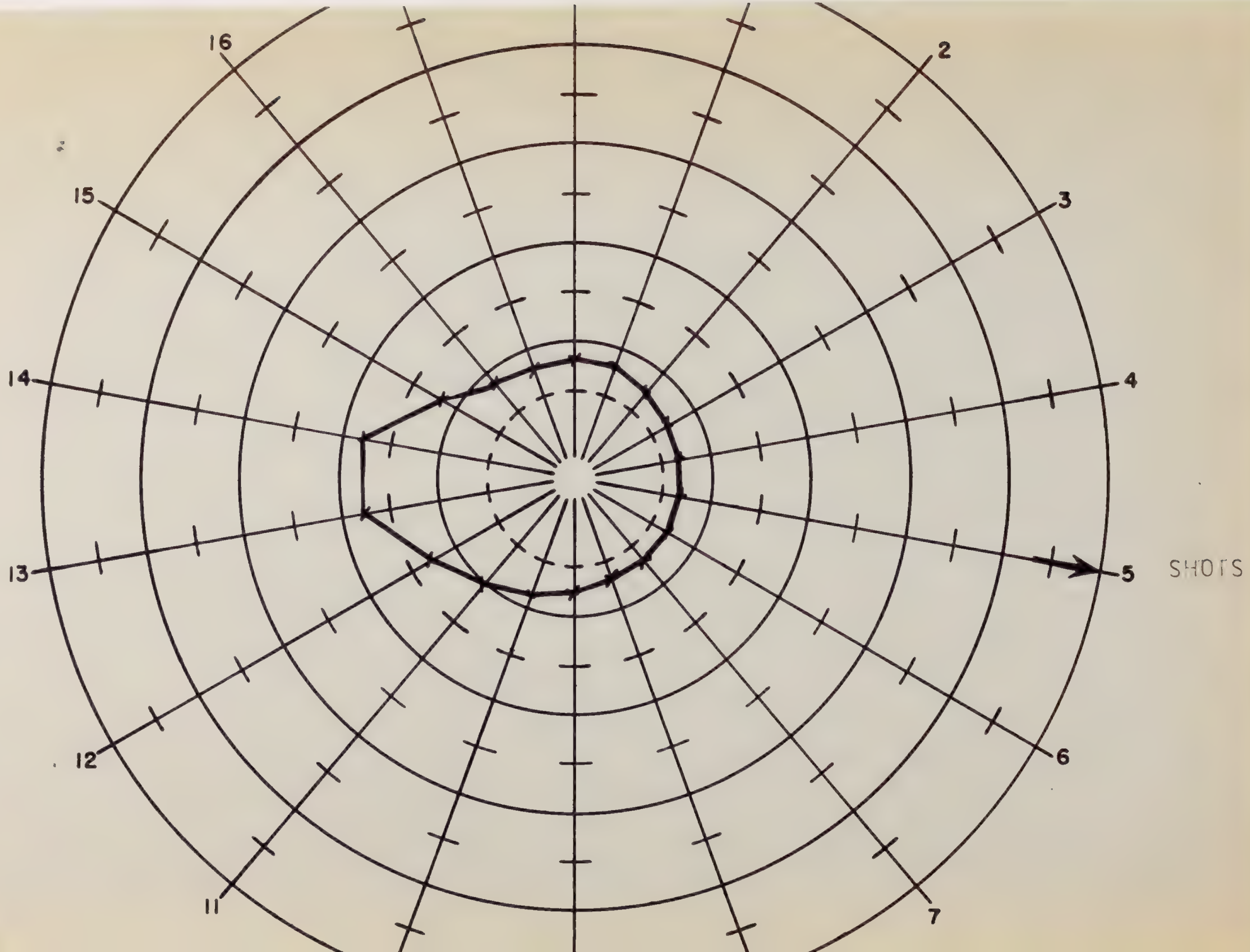
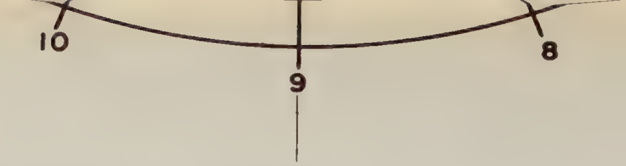
RADIORIENTATION PLOT

POT-B

0.2 SHORT STRING. PERFORATED 1189-1199 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME




16
2
15
3
14
4
13
5
SHOTS
12
6
11
7



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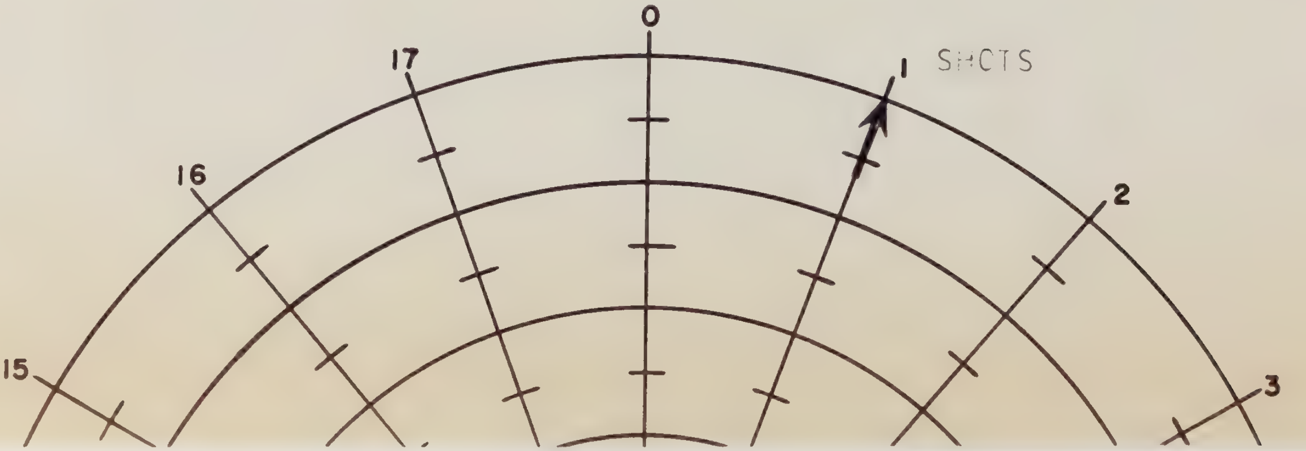
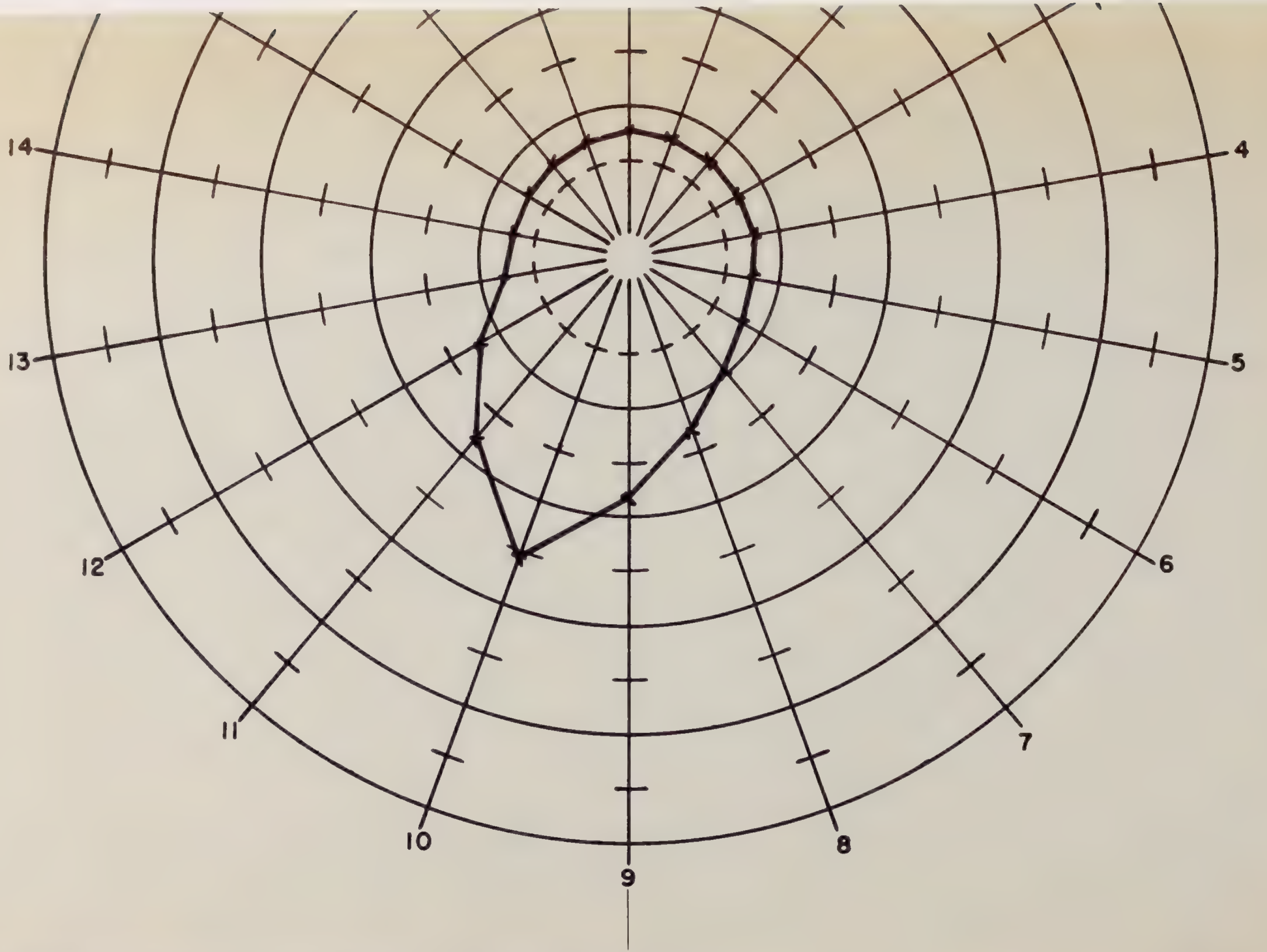
RADIORIENTATION PLOT

POT-B

NO.2 SHORT STRING PERFORATED 1178-1188 ONE SHOP PER FOOT WITH 1 11/16" HYPERDOME





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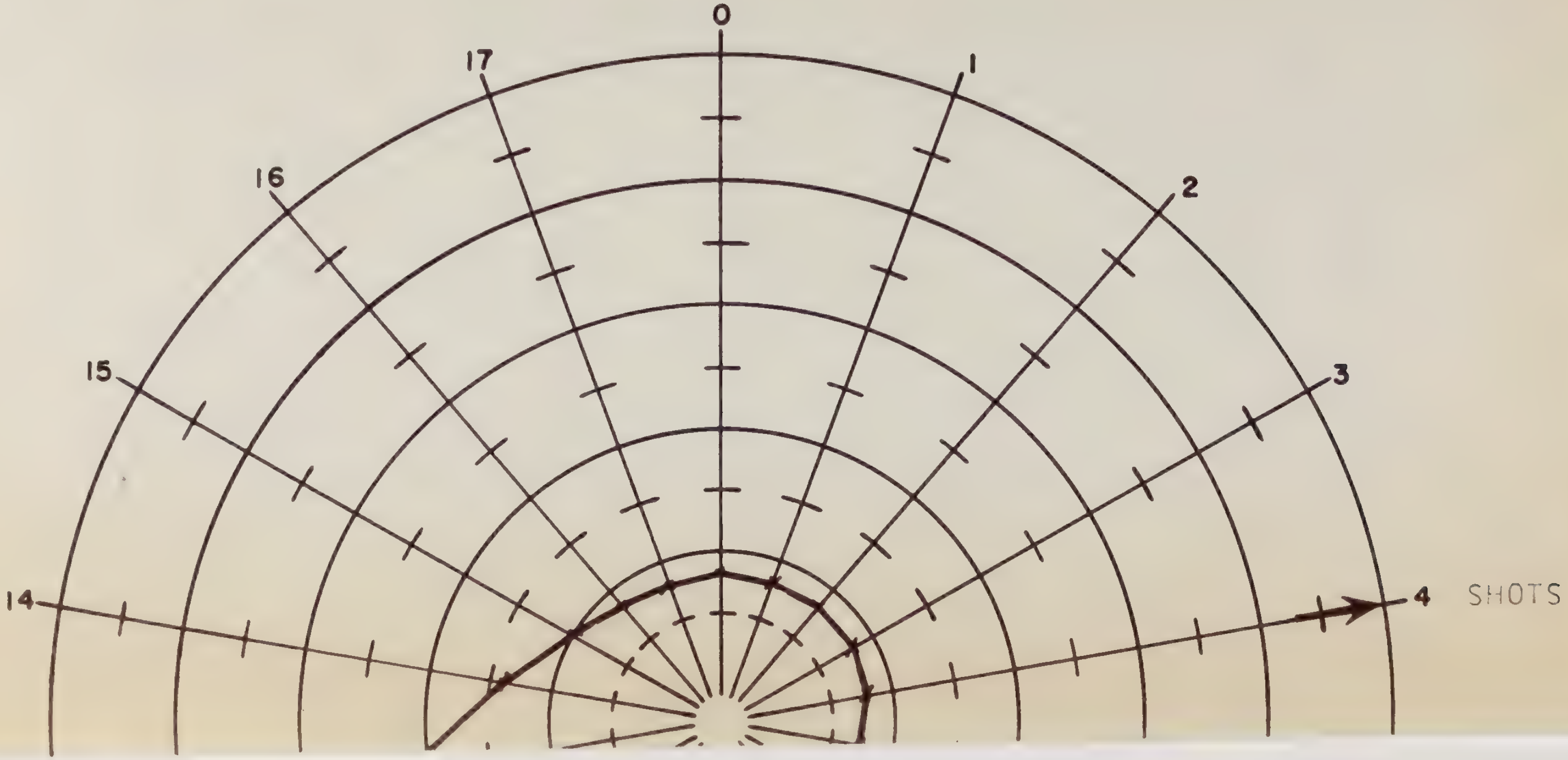
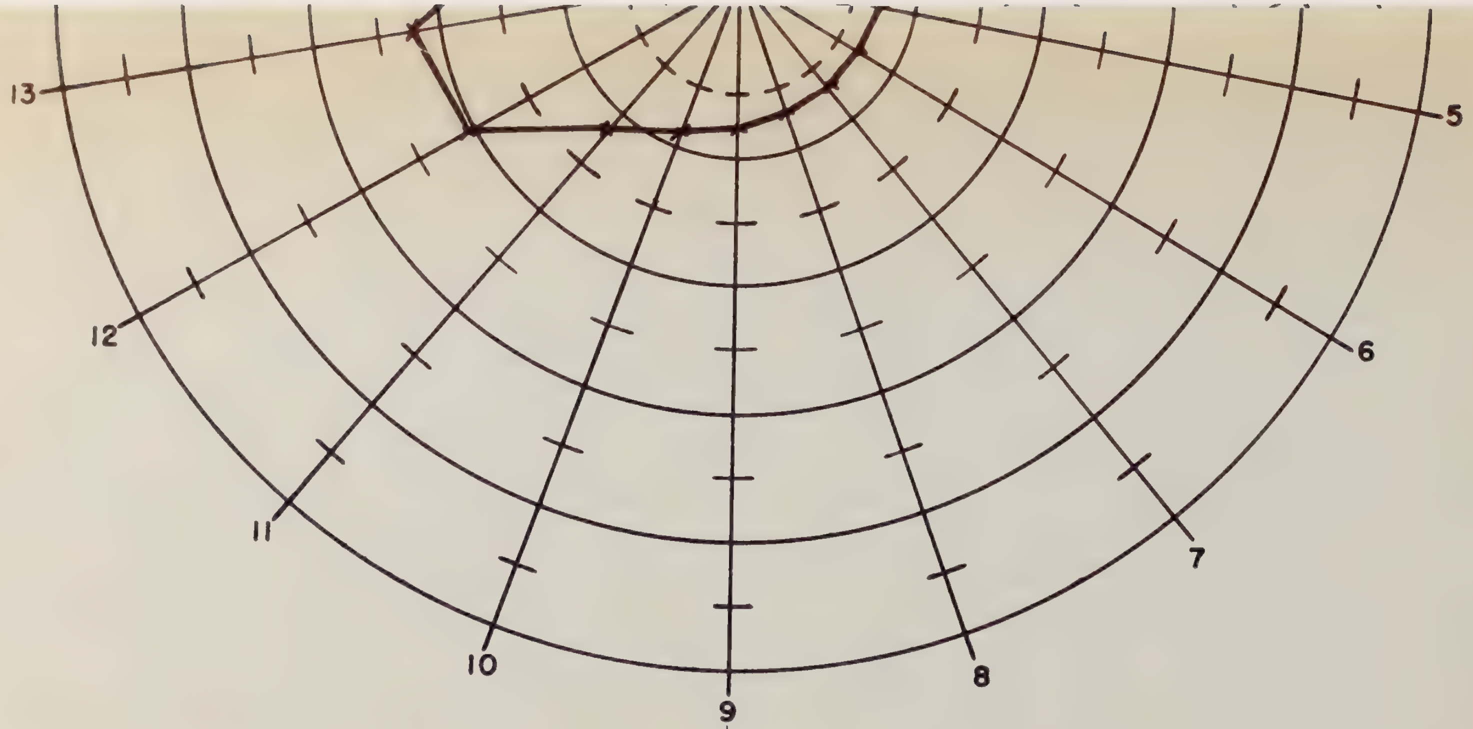
RADIORIENTATION PLOT

POT-B

NO.2 SHORT STRING PERFORATED 1170 1177 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





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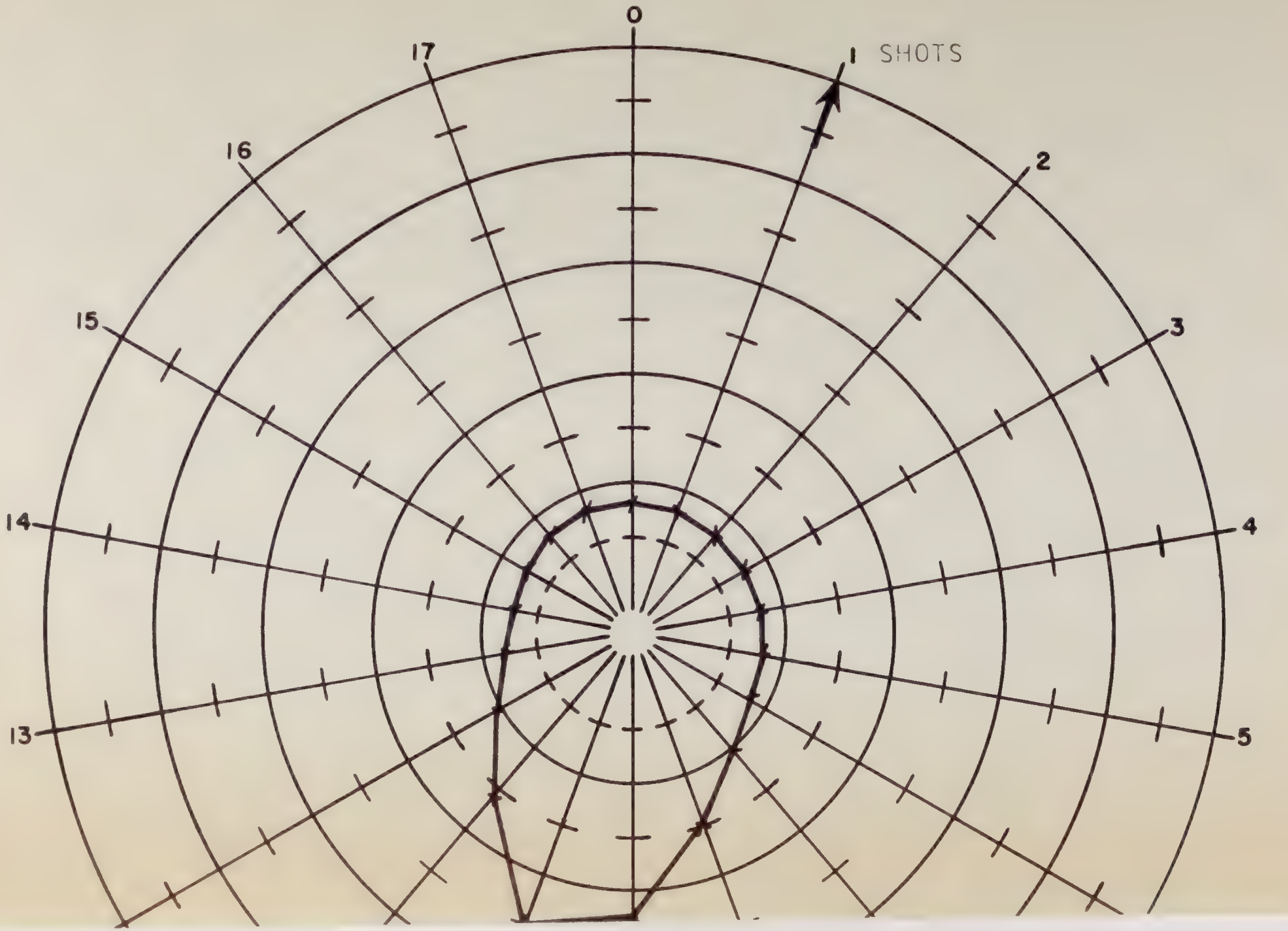
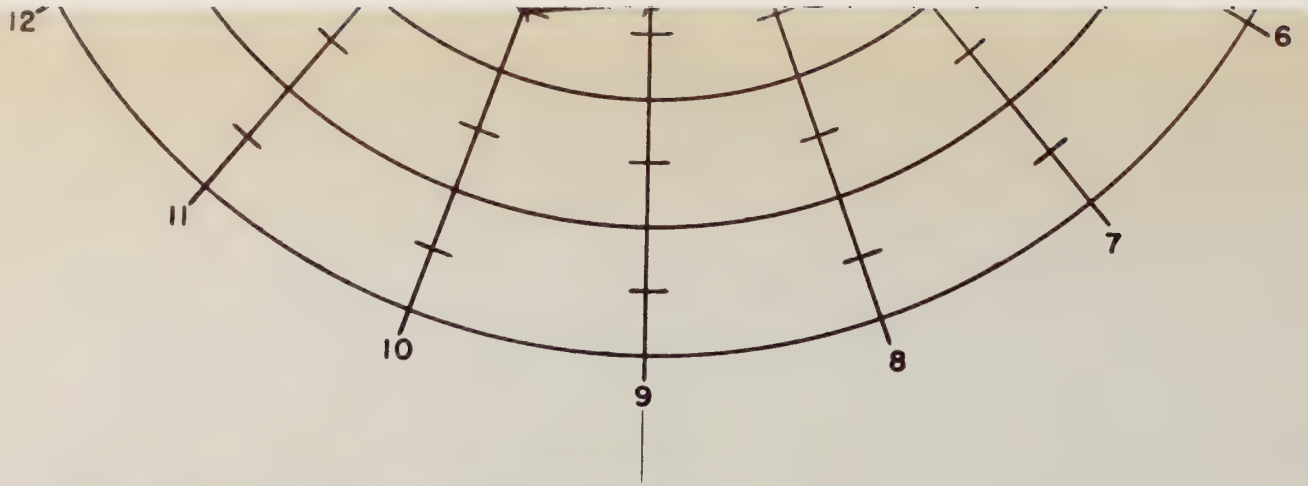
RADIORIENTATION PLOT

POT-B

[illegible] 2 SHORT STRING PERFORATED 1142-1152 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





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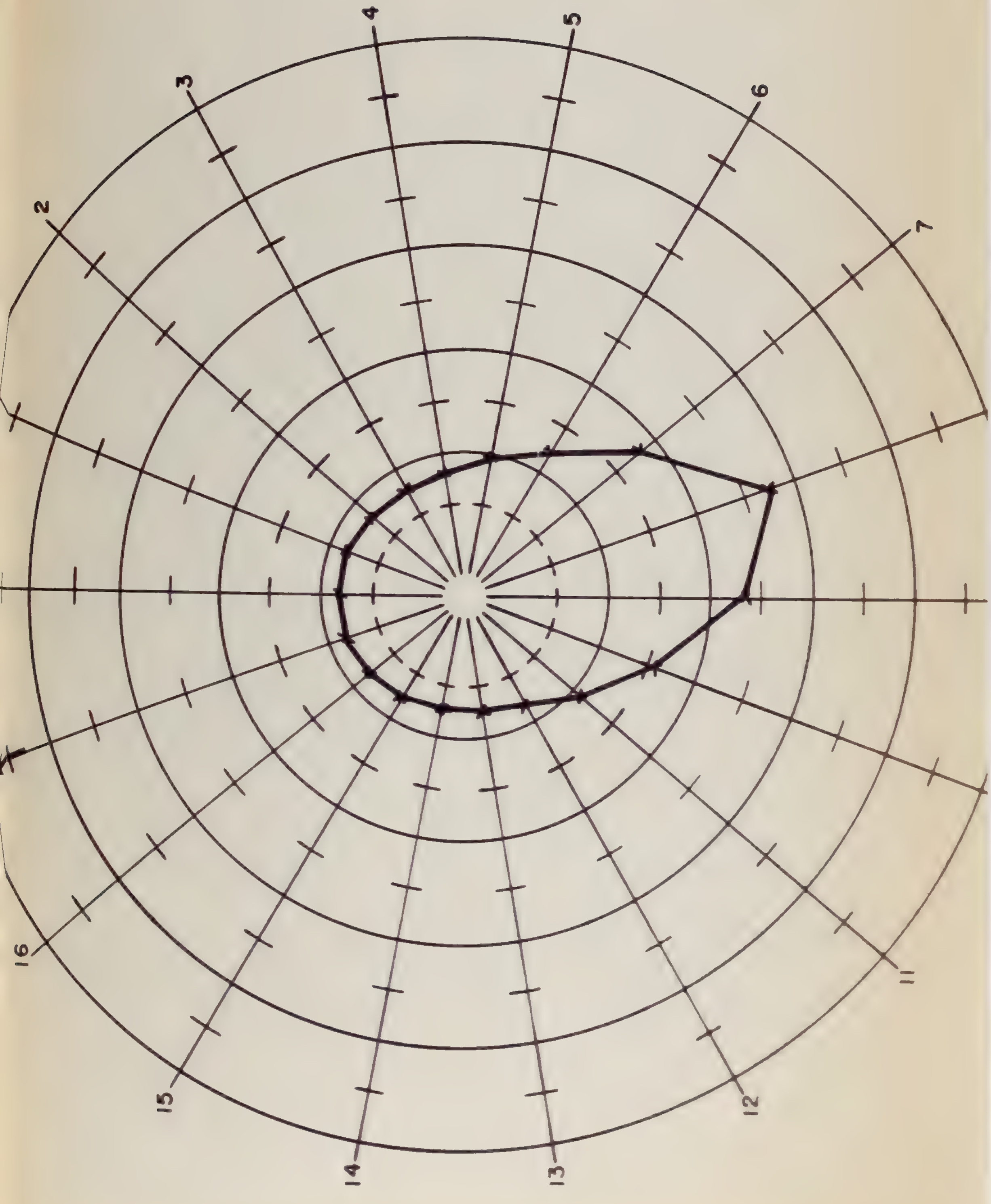
RADIORIENTATION PLOT

POT-B

NO.2 SHORT STRING PERFORATED 1132-1141 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME


2
3
4
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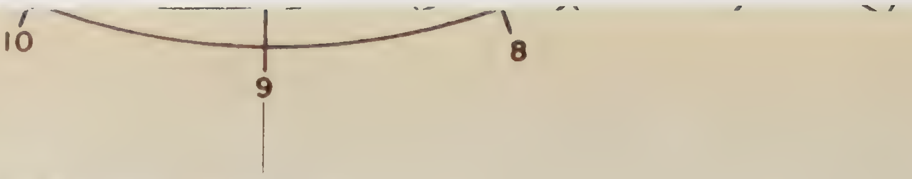
6
7
11
12
13
14
15
16



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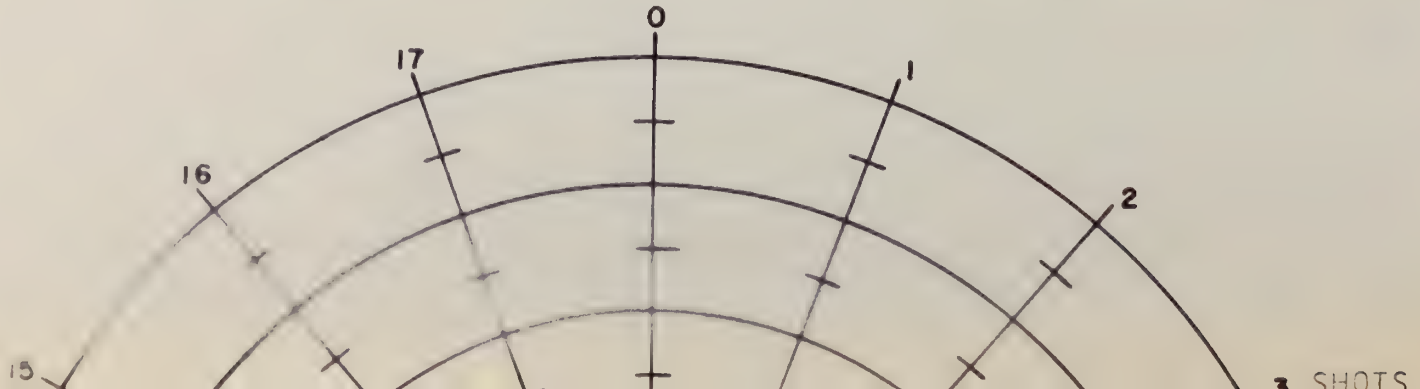
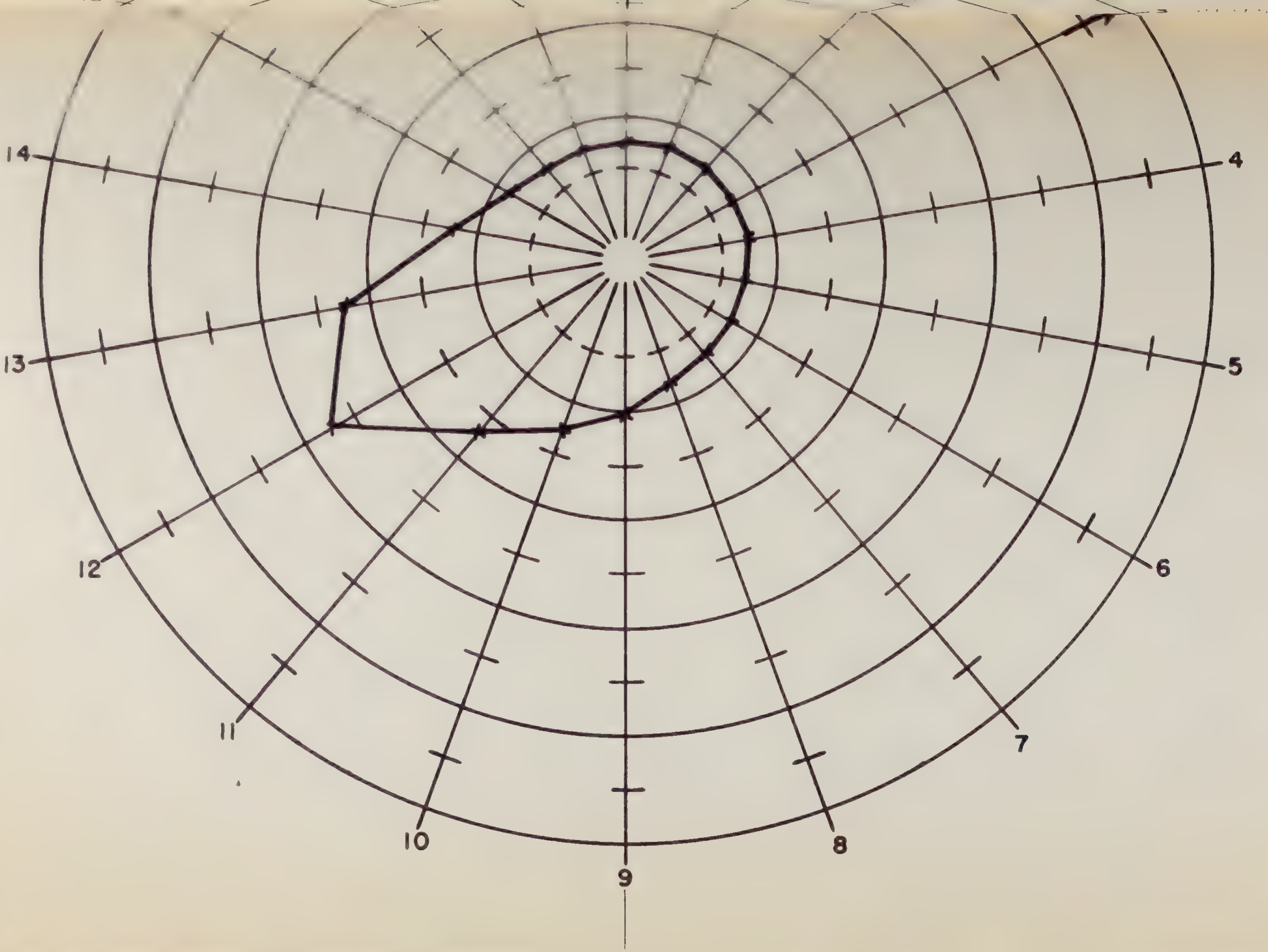
RADIORIENTATION PLOT

POT-B

NO.2 SHORT STRING PERFORATED 1122-1131 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





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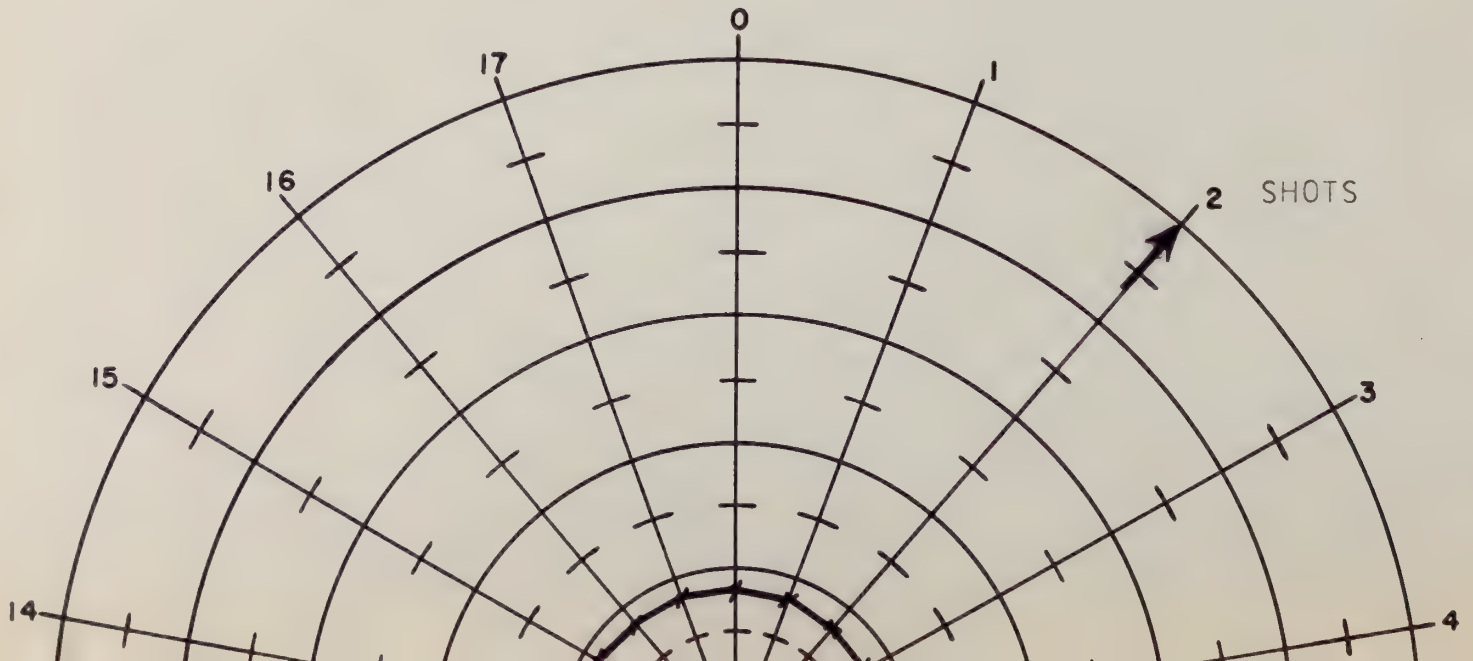
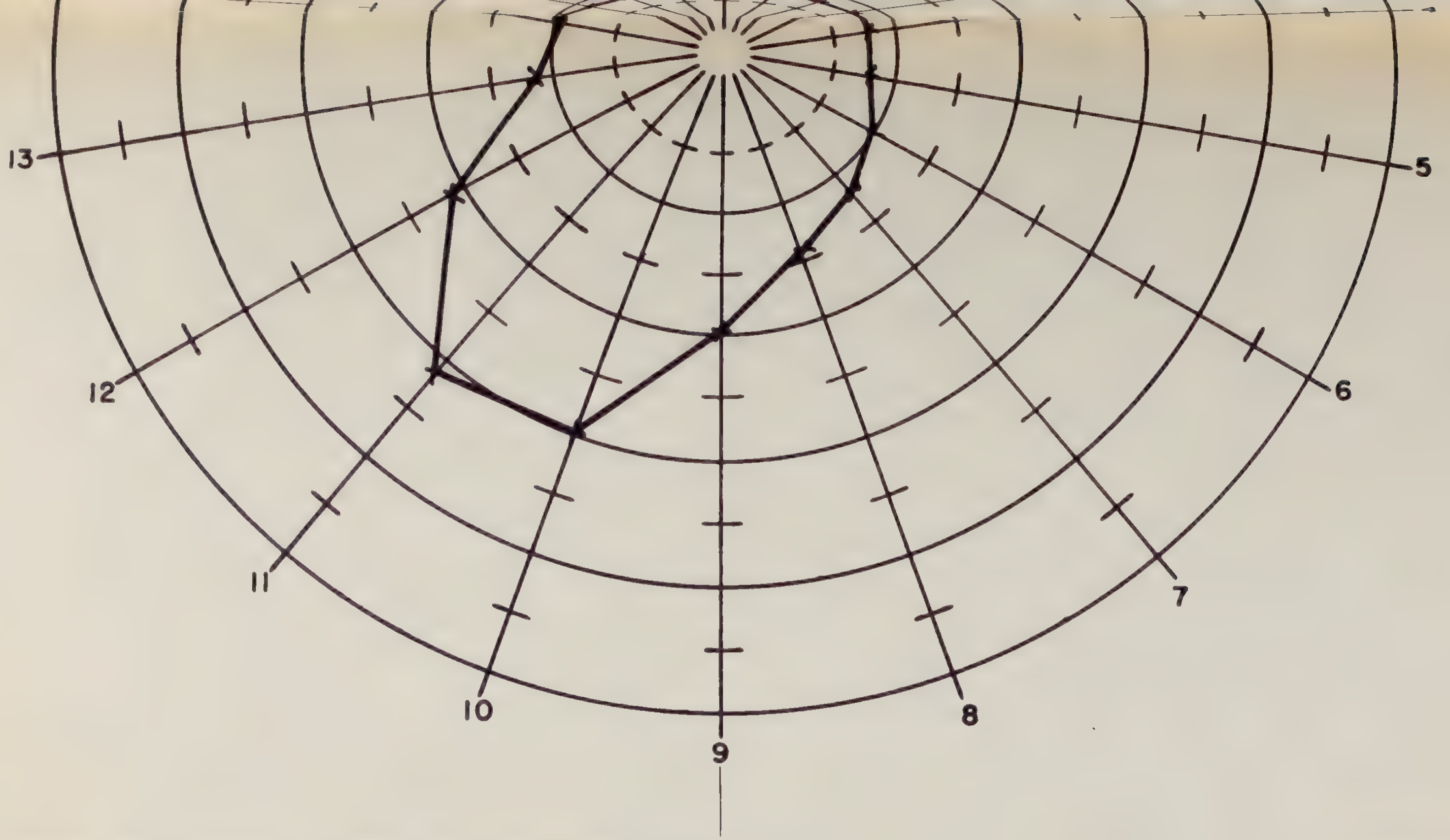
drill hole and other conditions unknown to us

RADIORIENTATION PLOT

POT-B

NO.2 SHORT STRING PERFORATED 1070-1080 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





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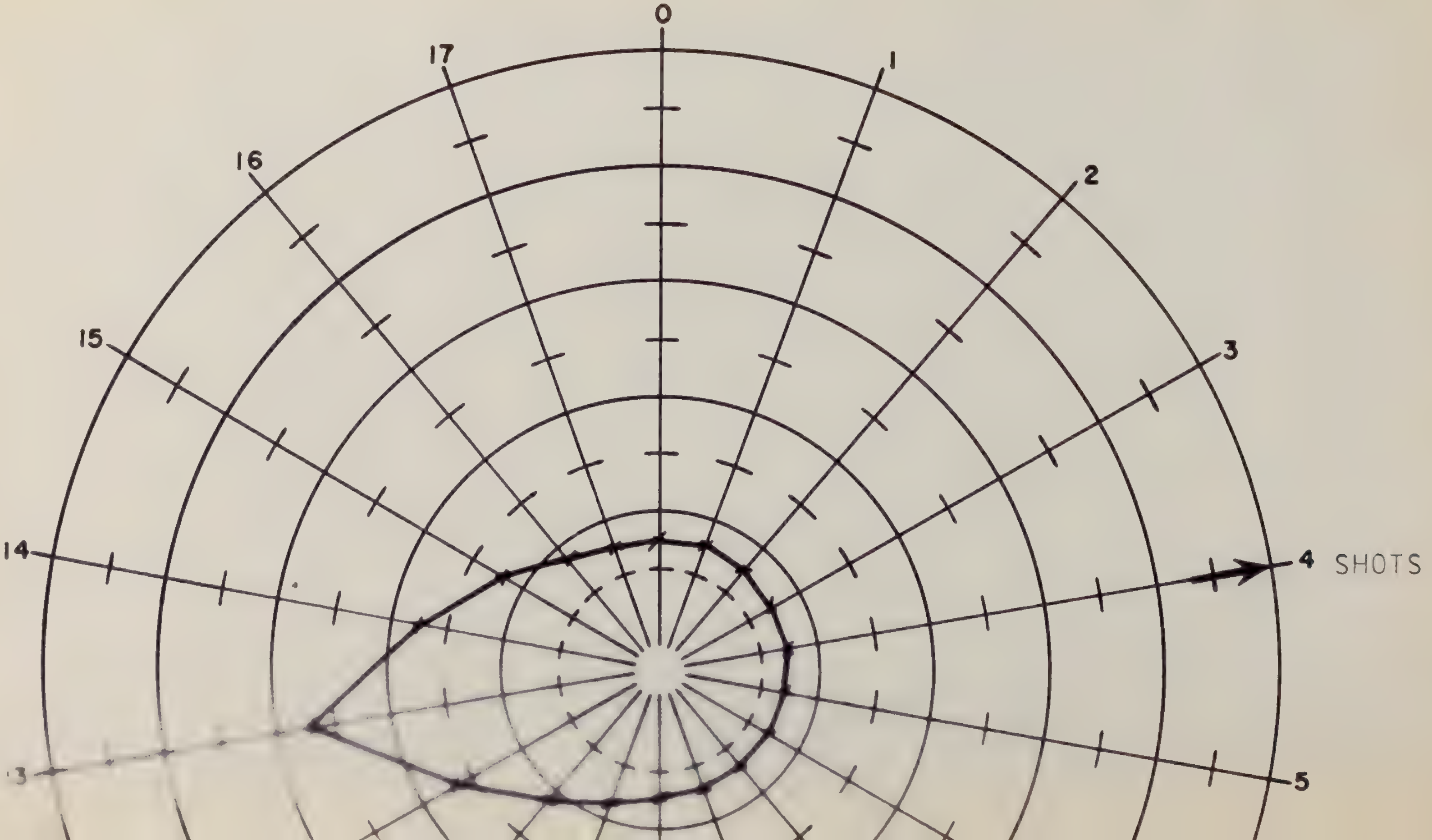
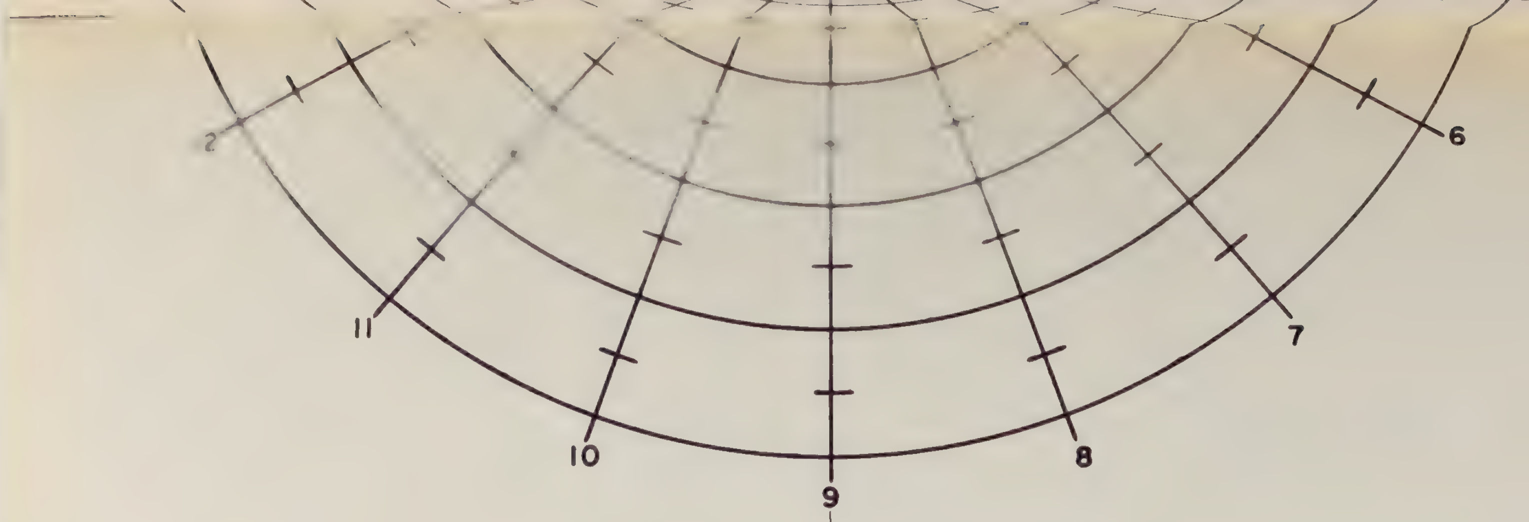
RADIORIENTATION PLOT

POT-B

0.2 SHORT STRING PERFORATED 1062-1069 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





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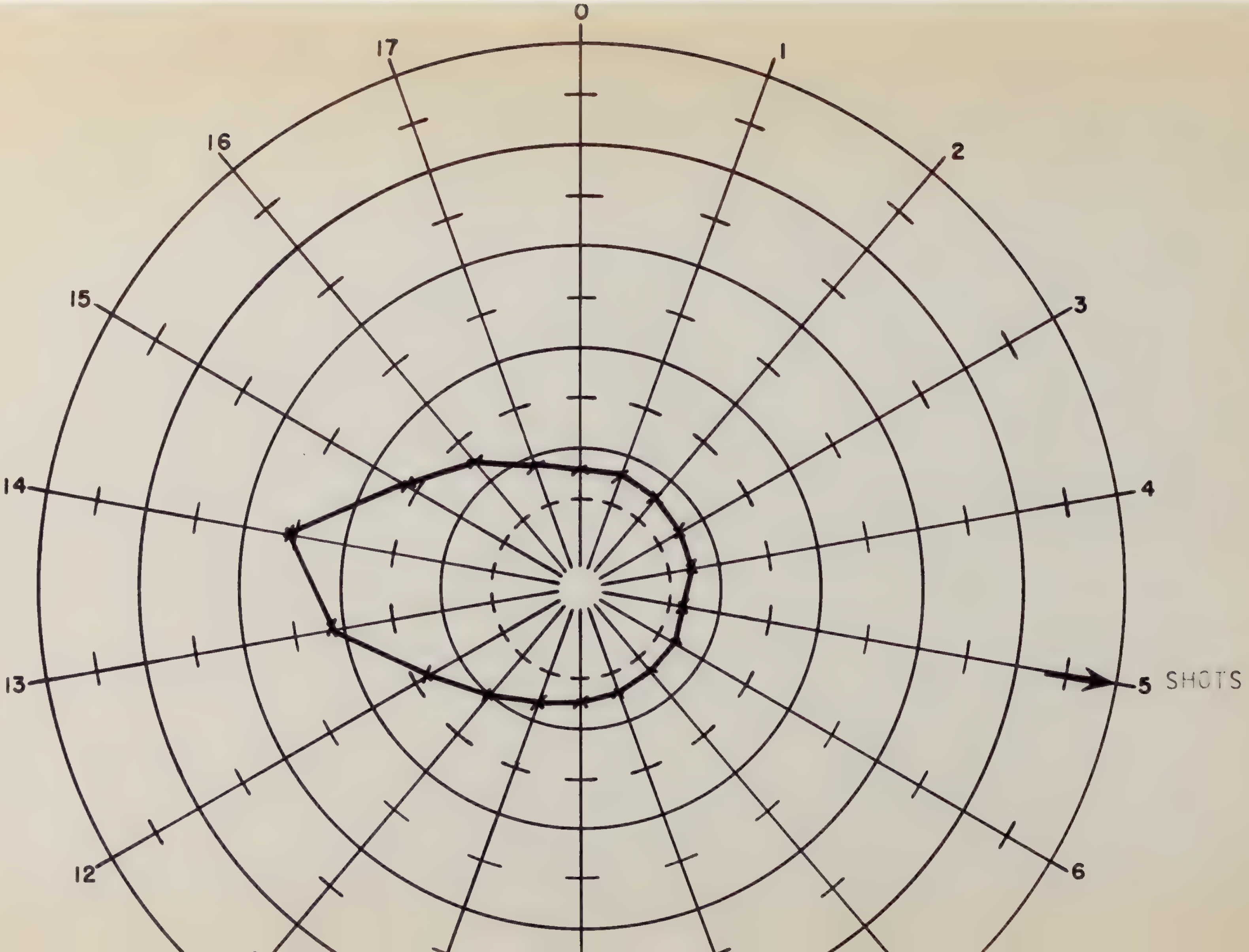
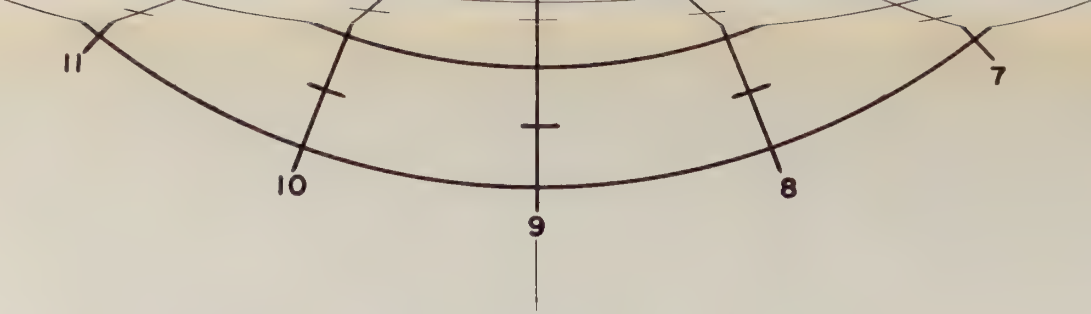
RADIORIENTATION PLOT

POT-B

NO.2 SHORT STRING PERFORATED 1054-1061 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME


0
1
2
3
4
5 SHOTS
6
12
13
14
15
16
17



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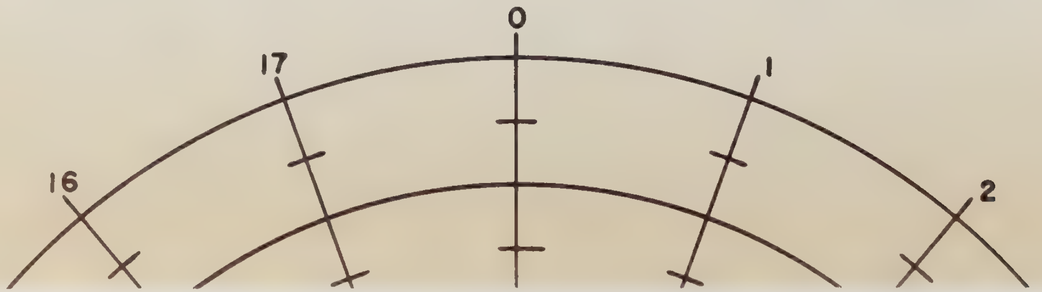
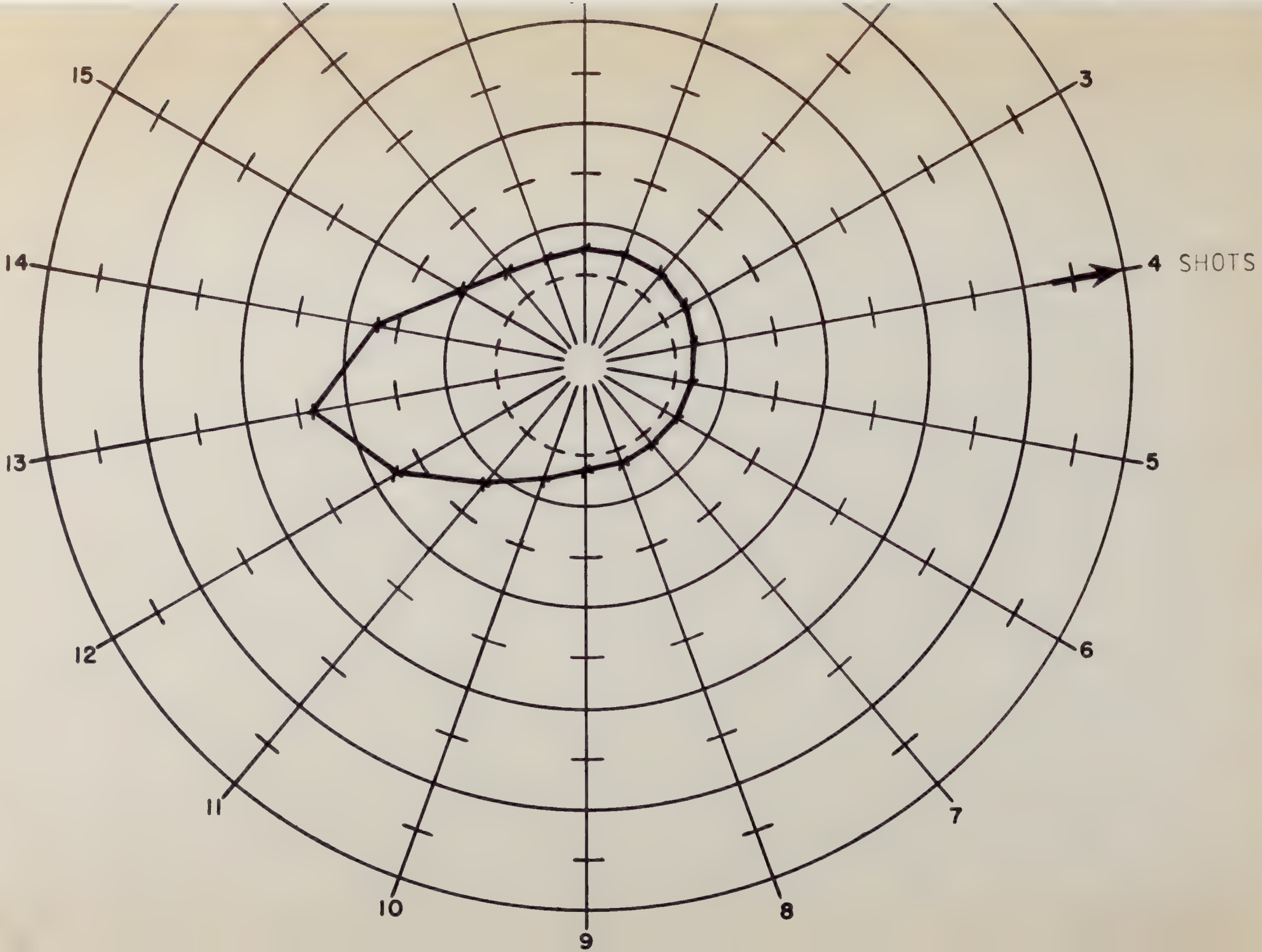
RADIORIENTATION PLOT

POT-B

NO.2 SHORT STRING PERFORATED 1036-1046 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME




15
3
14
4 SHOTS
13
5
12
6
11
7
10
8
9

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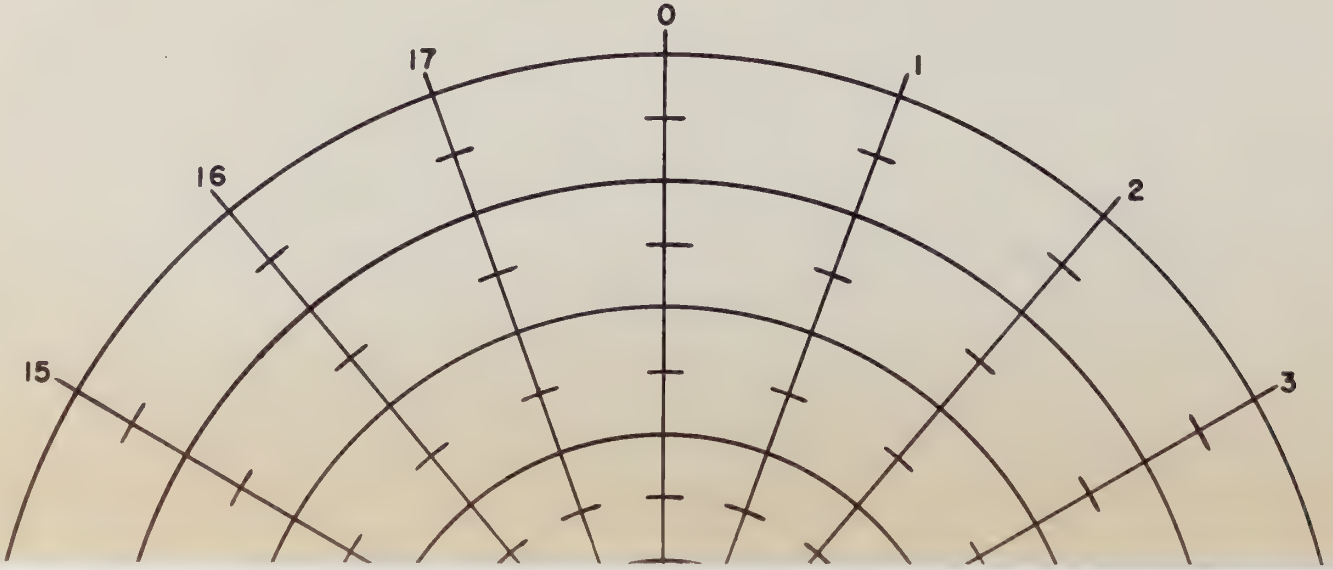
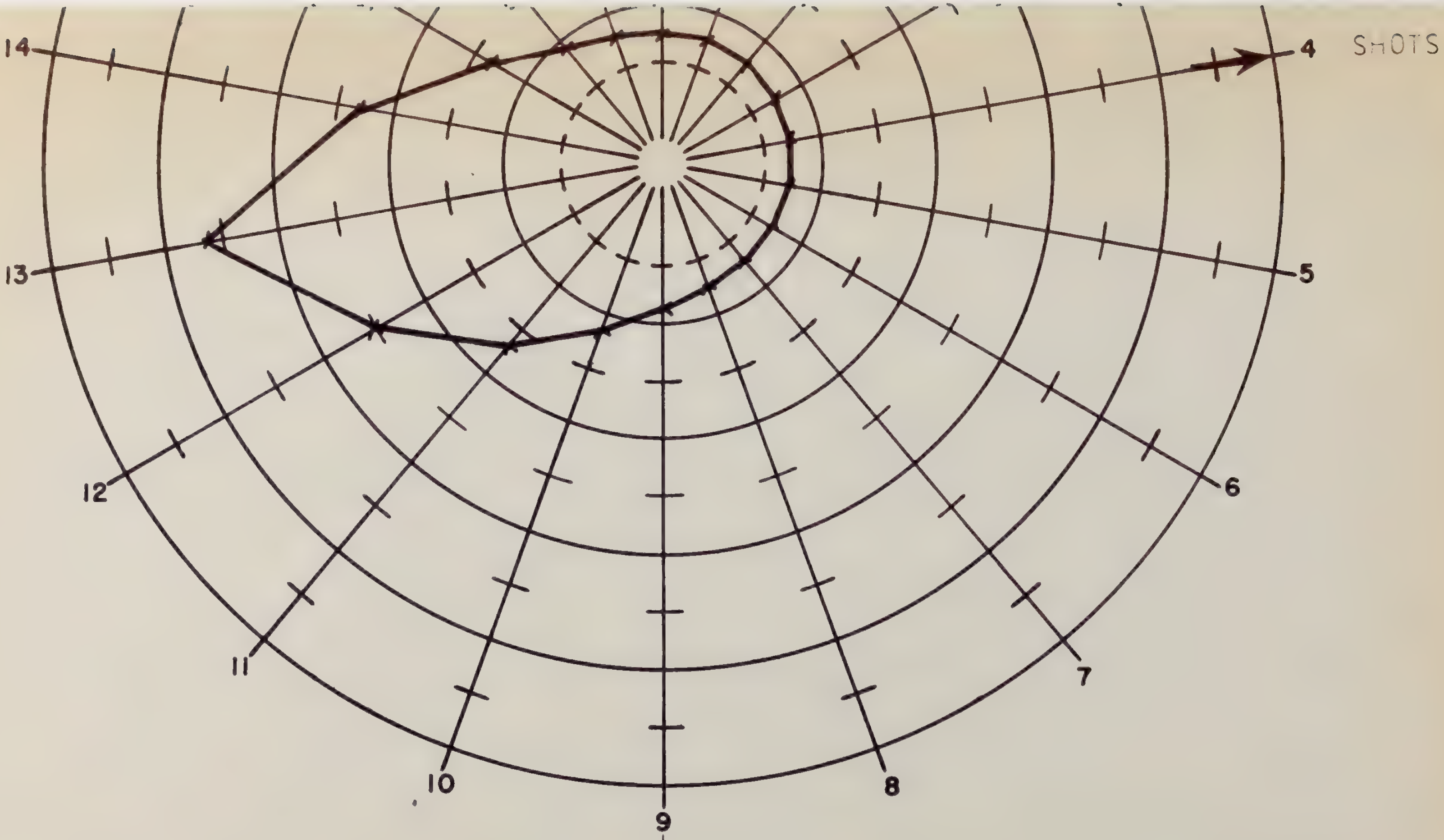
RADIORIENTATION PLOT

POT-B

NO.2 SHORT STRING PERFORATED 1014-1024 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





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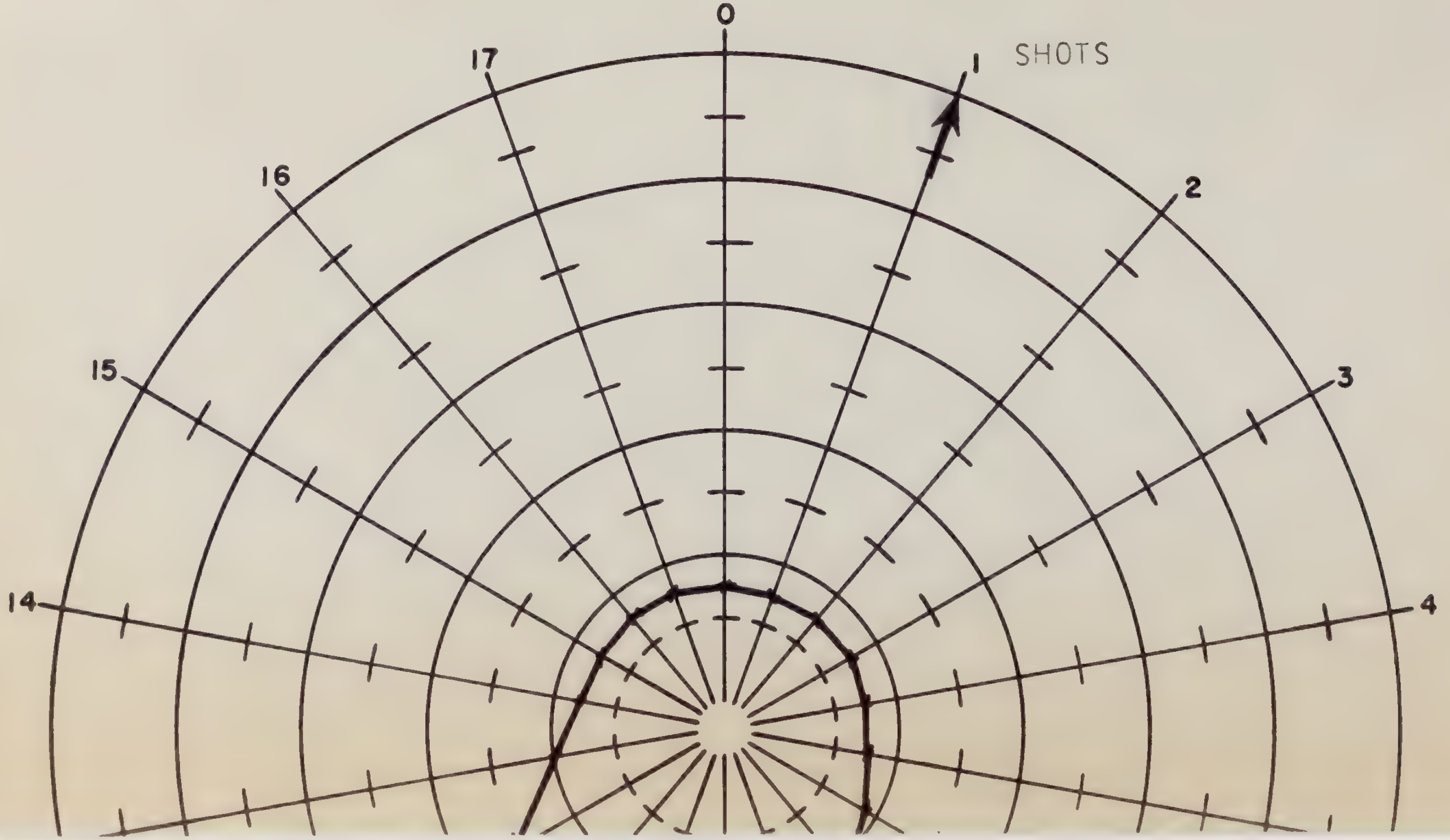
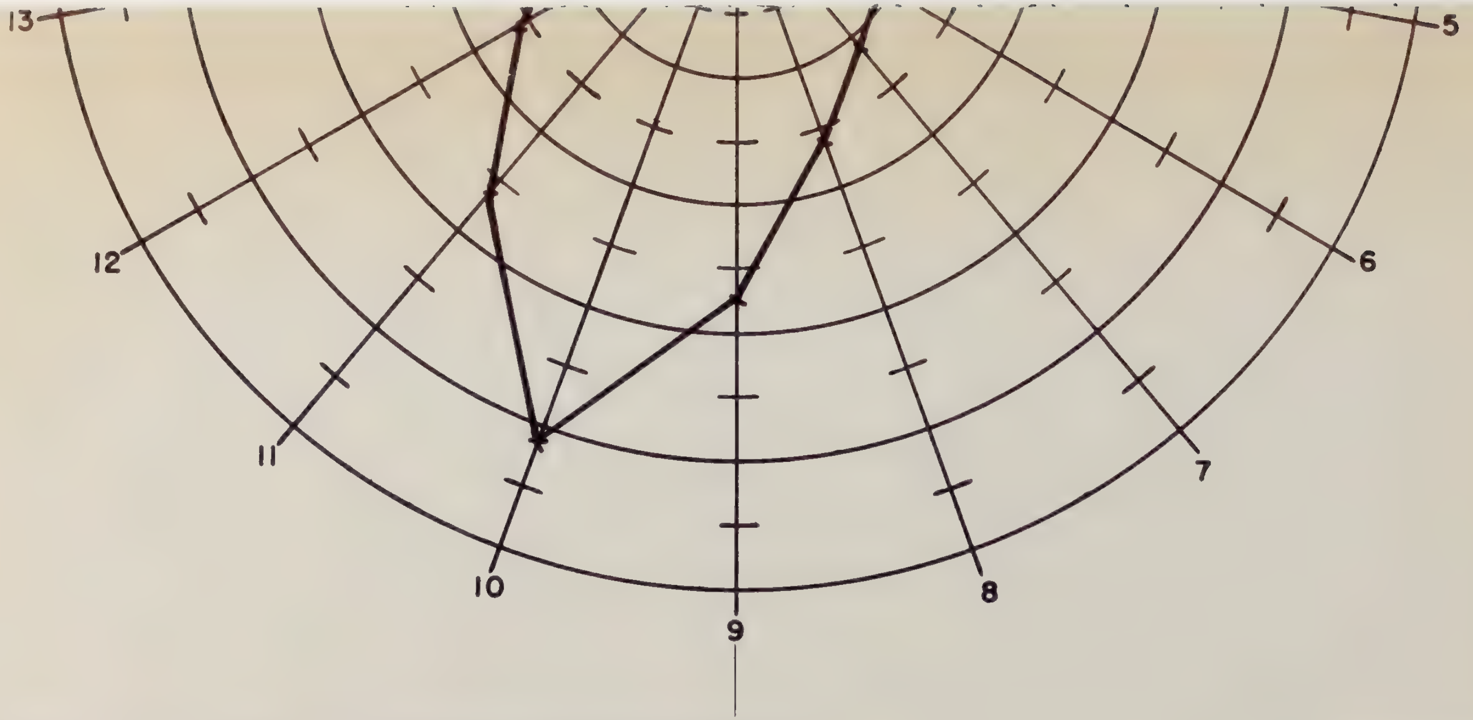
RADIORIENTATION PLOT

POT-B

NO.2 SHORT STRING PERFORATED 980-990 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





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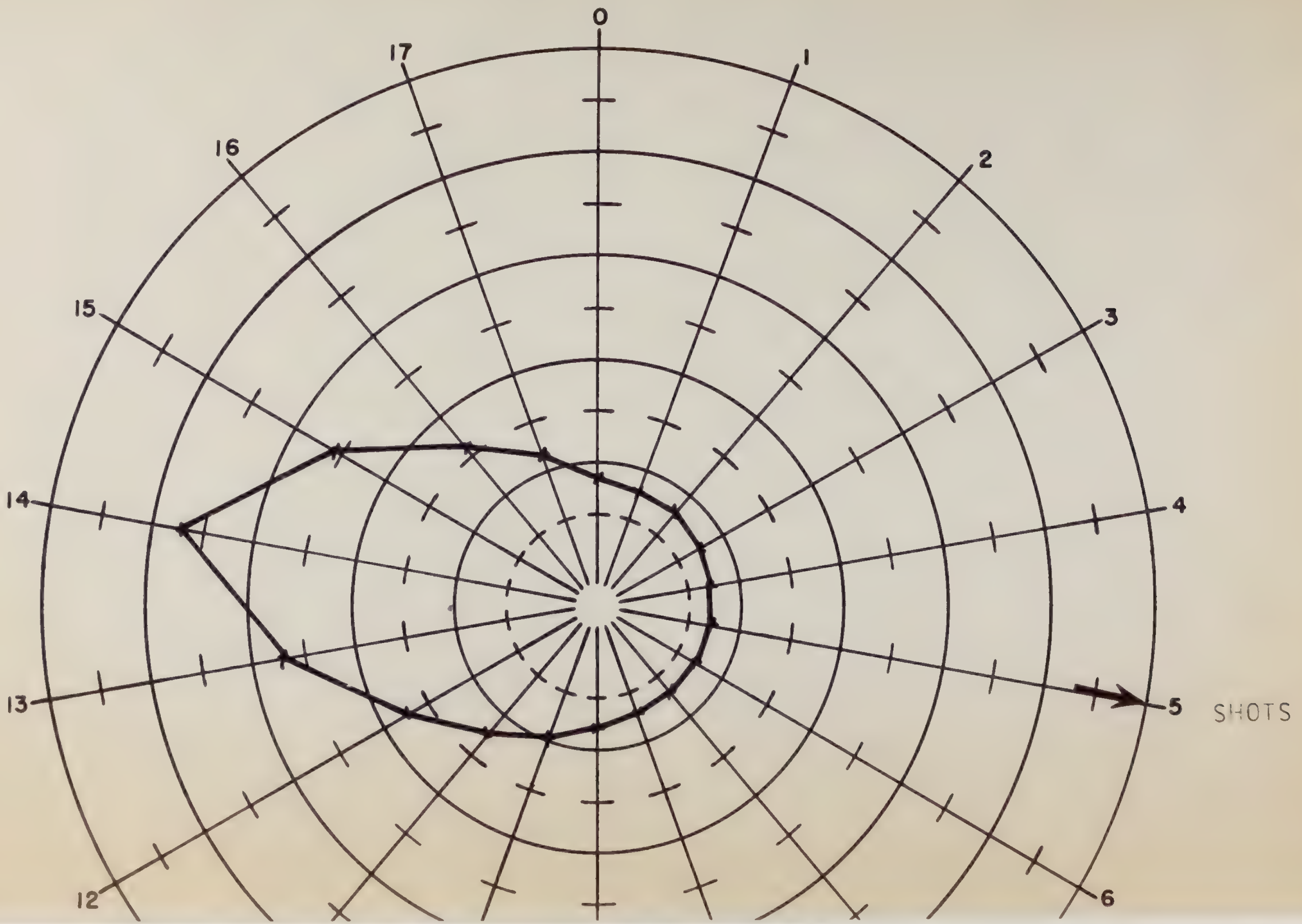
Schlumberger

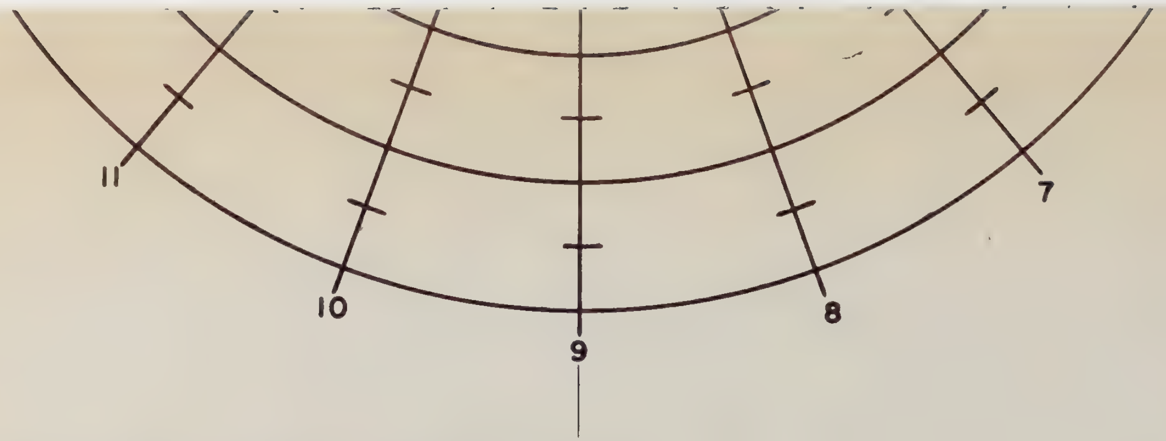
RADIORIENTATION PLOT

RADIORIENTATION PLOT

POT-B

NO.2 SHORT STRING PERFORATED 970-979 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





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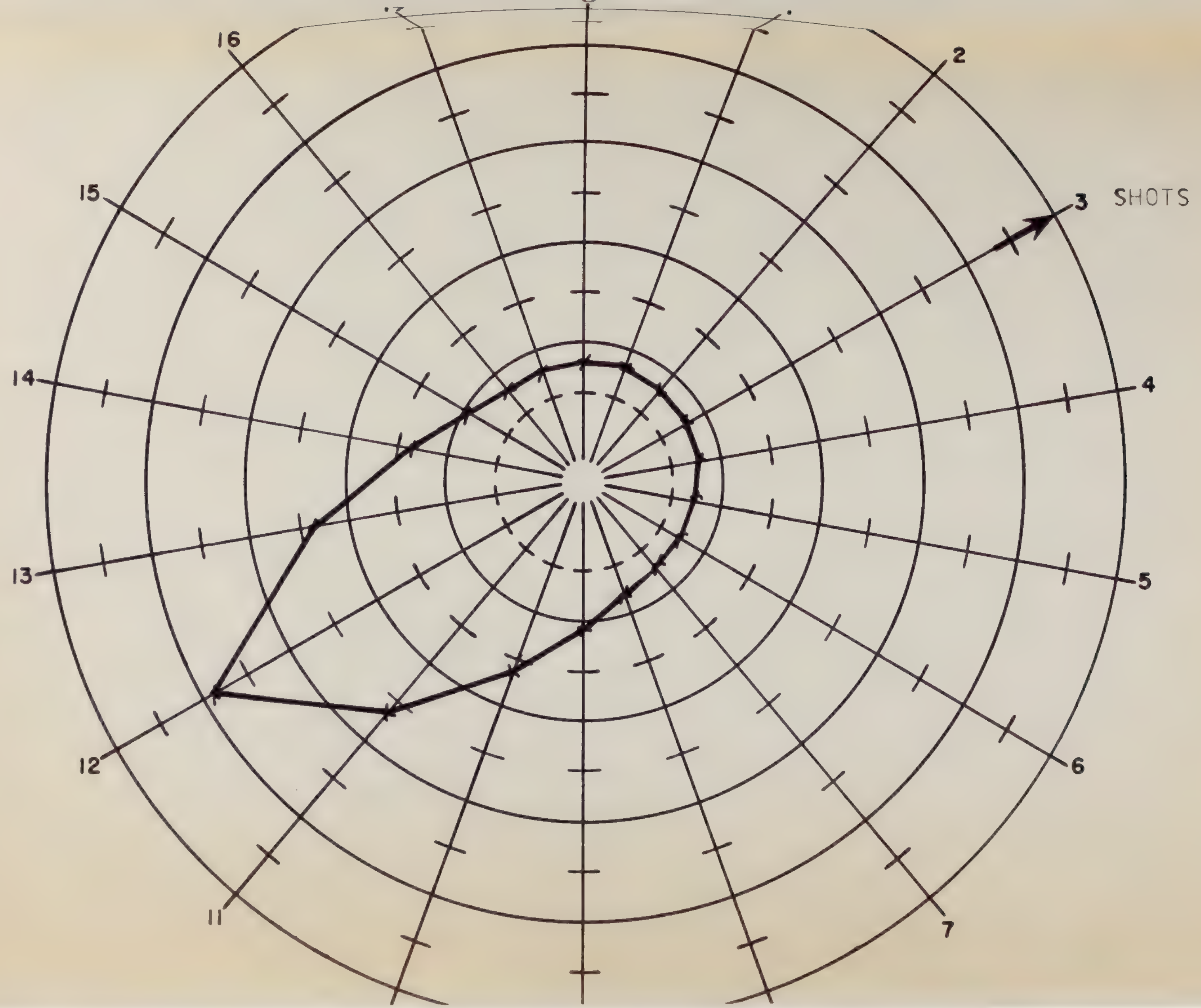
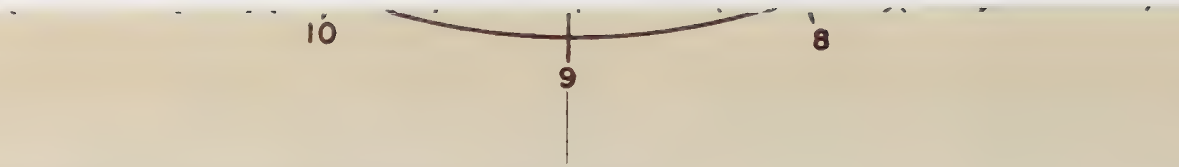
Schlumberger

RADIORIENTATION PLOT

POT-B

NO.2-SHORT STRING PERFORATED 960-969 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME


16
2
15
3
SHOTS
14
4
13
5
12
6
11
7



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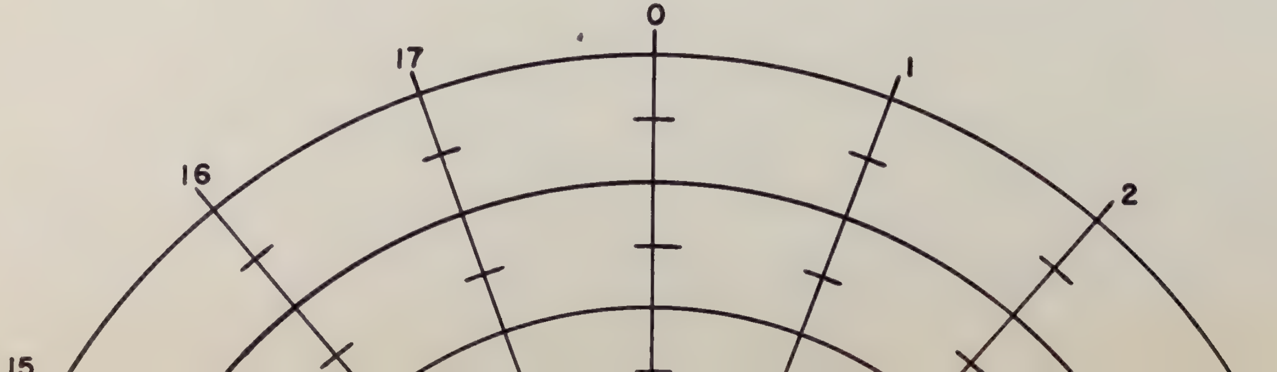
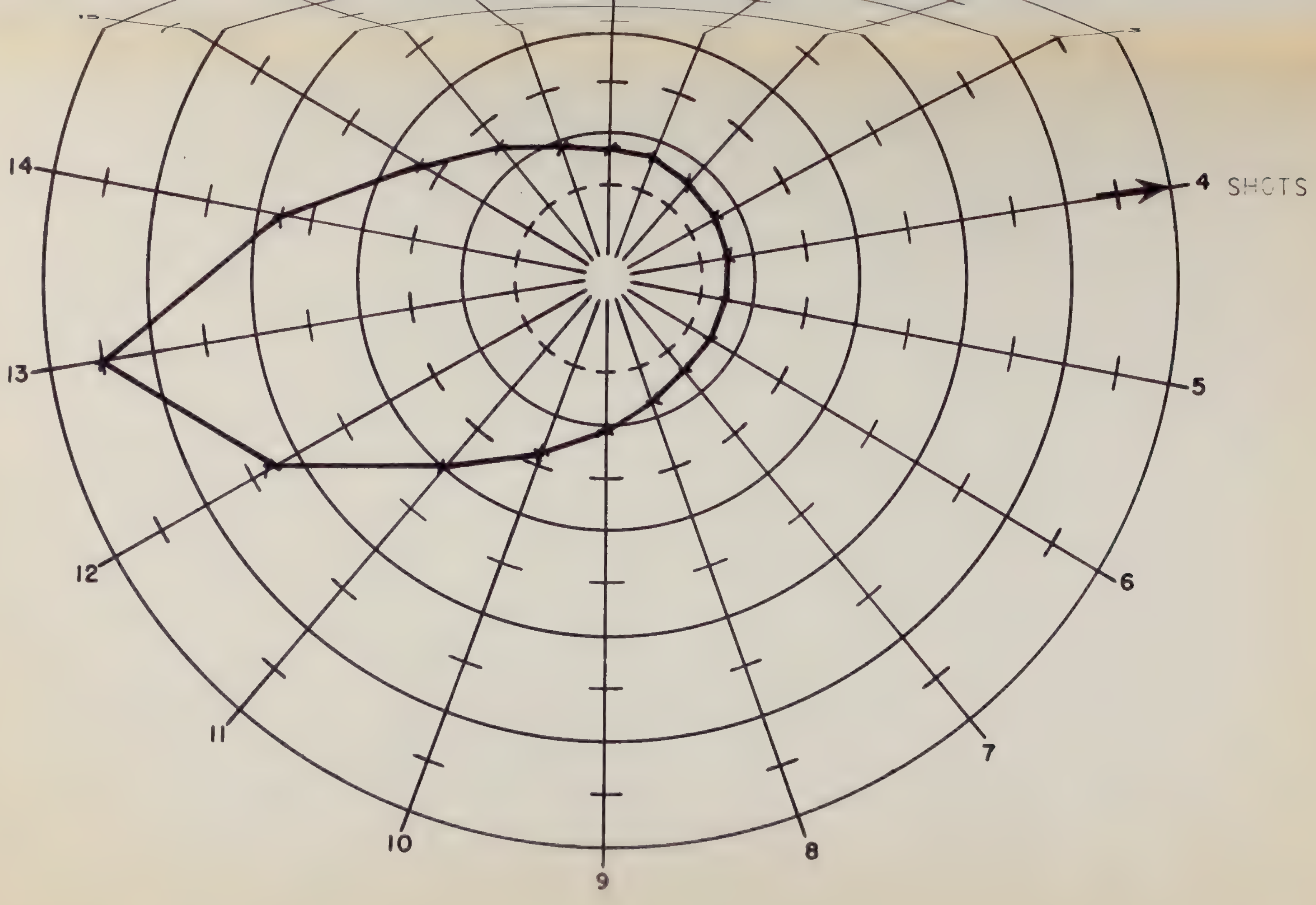
RADIORIENTATION PLOT

POT-B

NO.2 SHORT STRING PERFORATED 950-959 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME



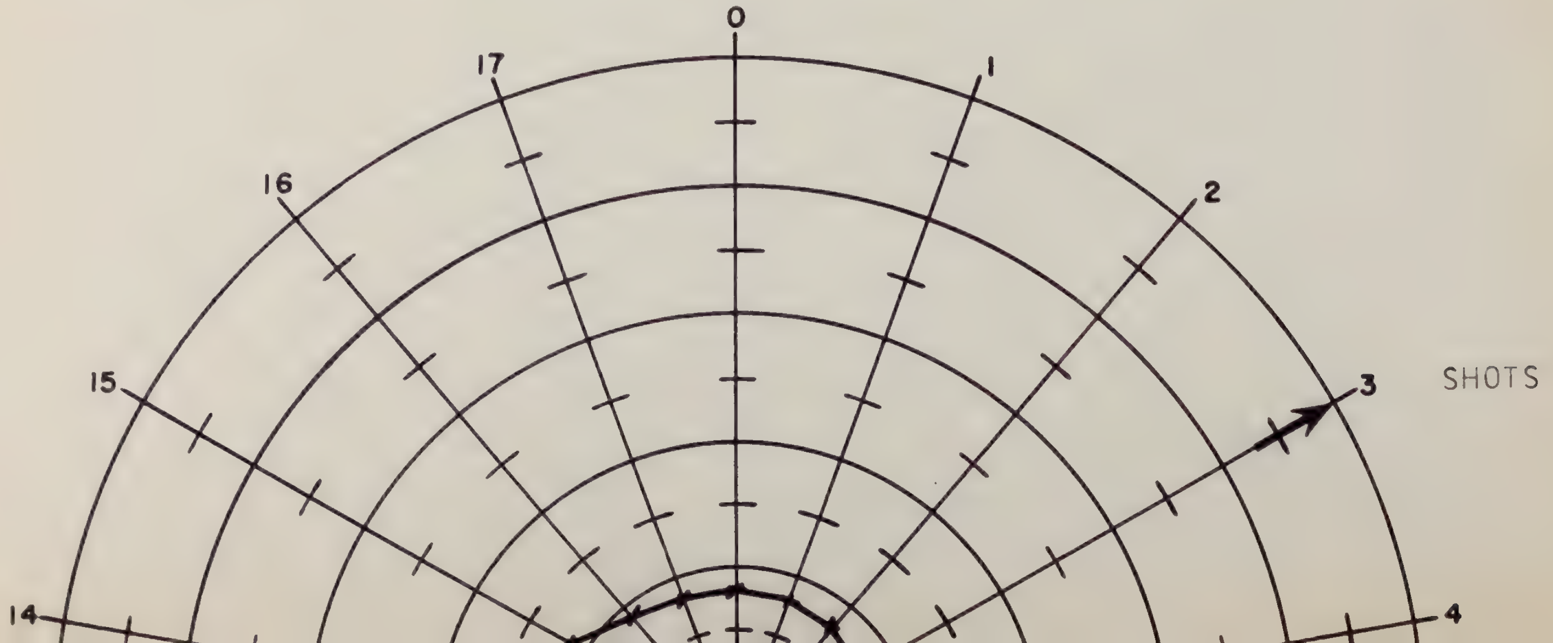


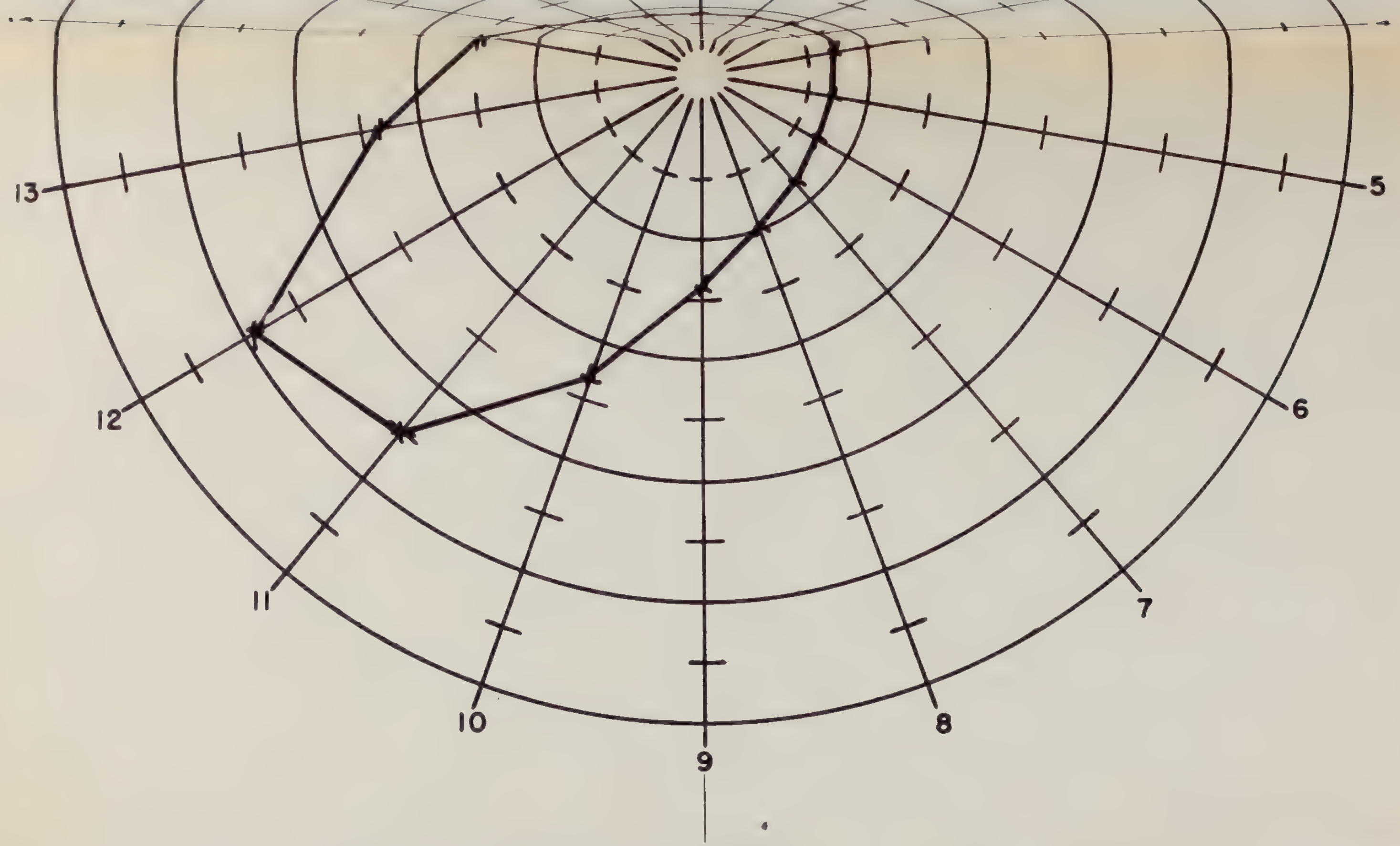
Schlumberger

RADIORIENTATION PLOT

POT-B

NO. 2 SHORT STRING PERFORATED 940-949 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by vagrant metal in the drill hole and other conditions unknown to us.

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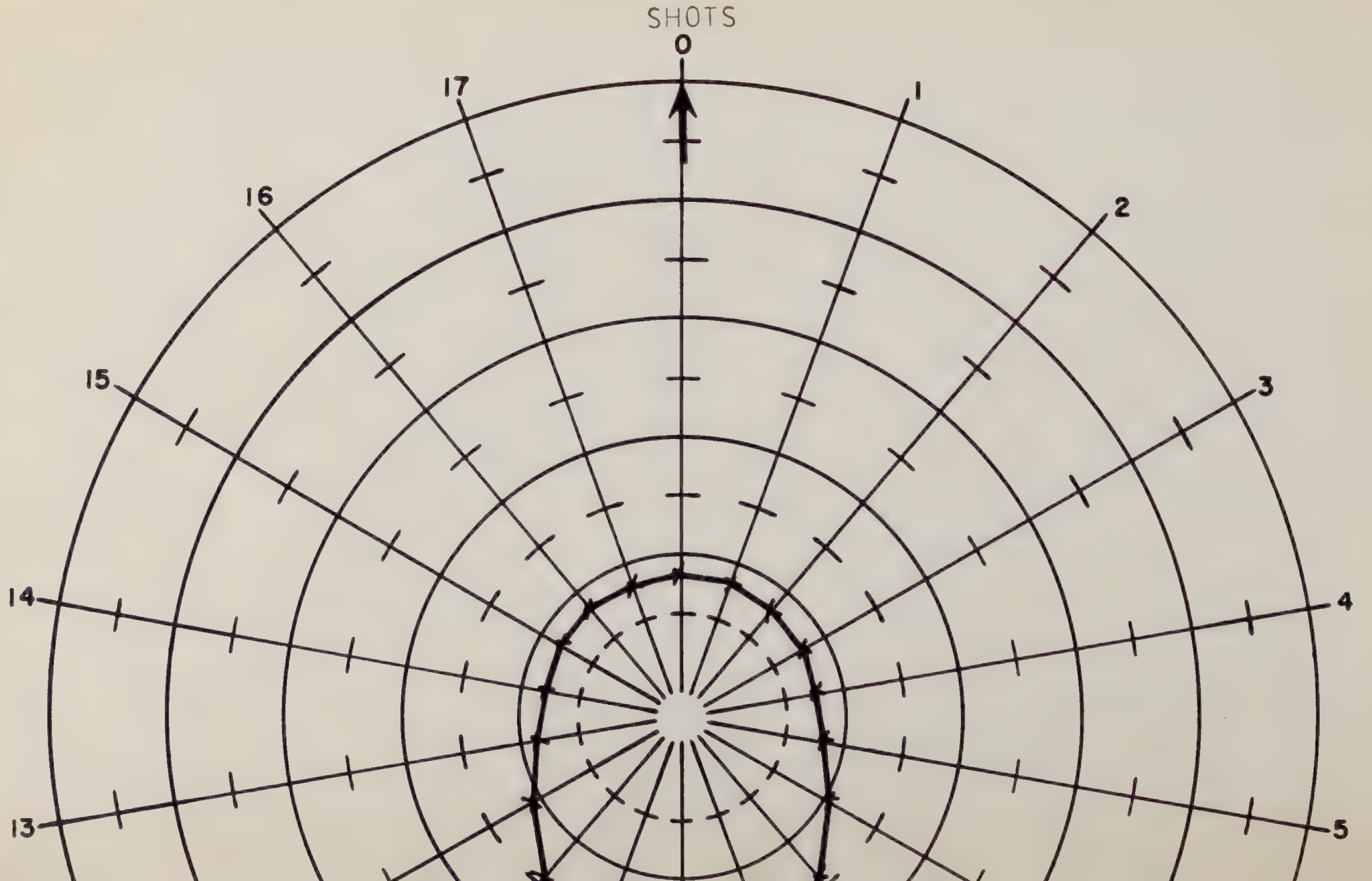
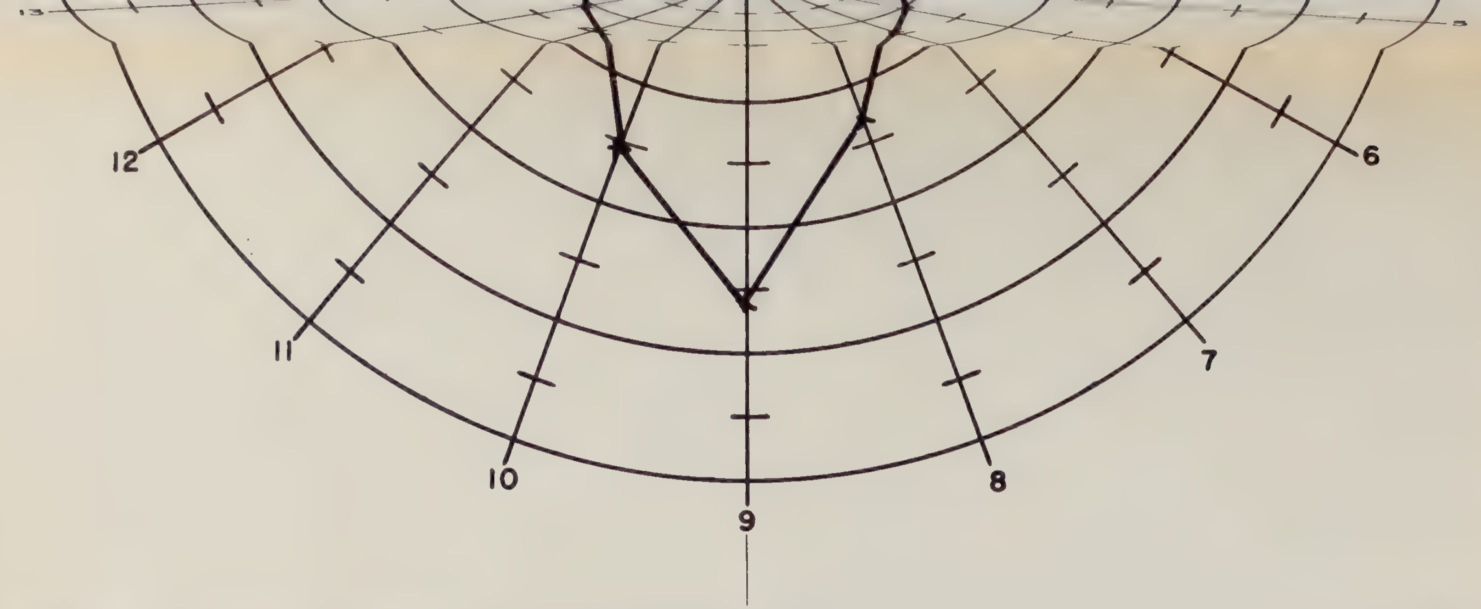
RADIORIENTATION PLOT

POT-B

NO.2 SHORT STRING PERFORATED 930-939 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





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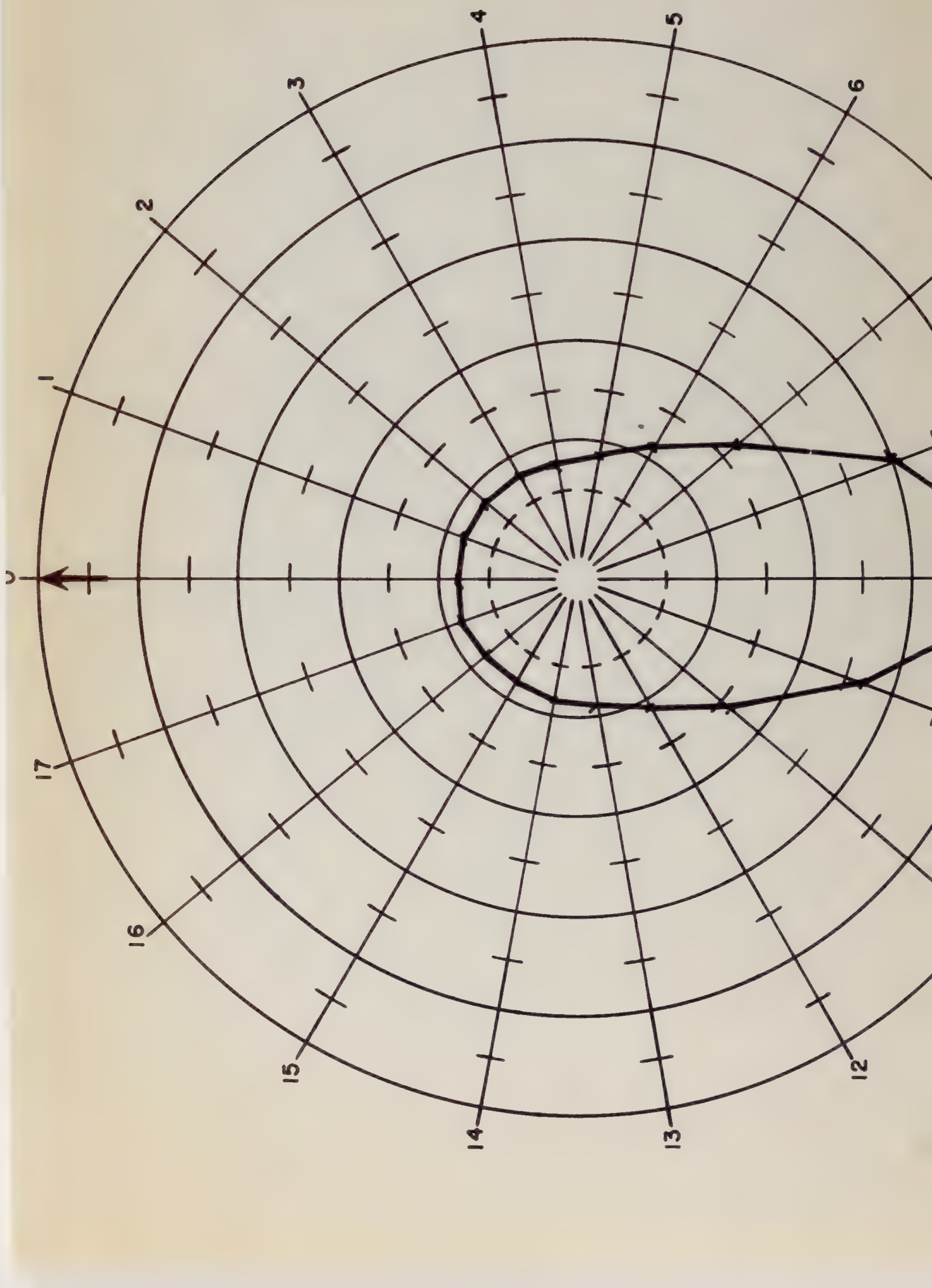
RADIORIENTATION PLOT

POT-B

NO.2 SHORT STRING PERFORATED 920-929 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME

SHOTS


0
1
2
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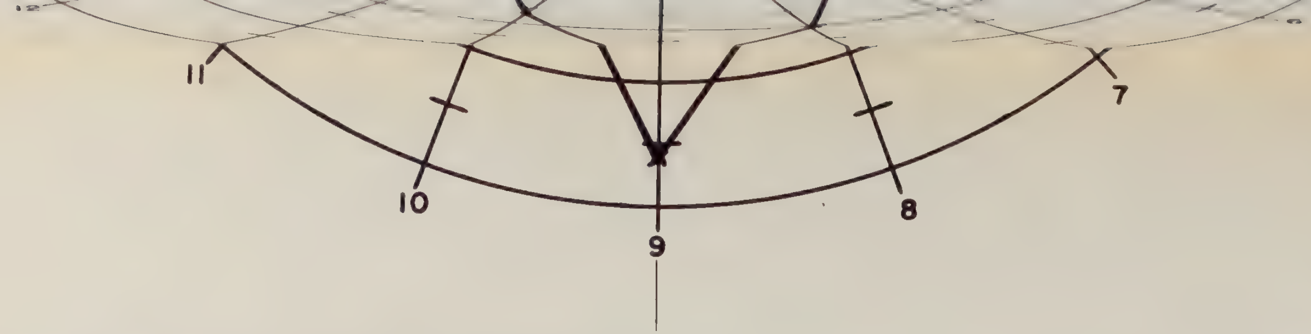
4
5
6
12
13
14
15
16
17



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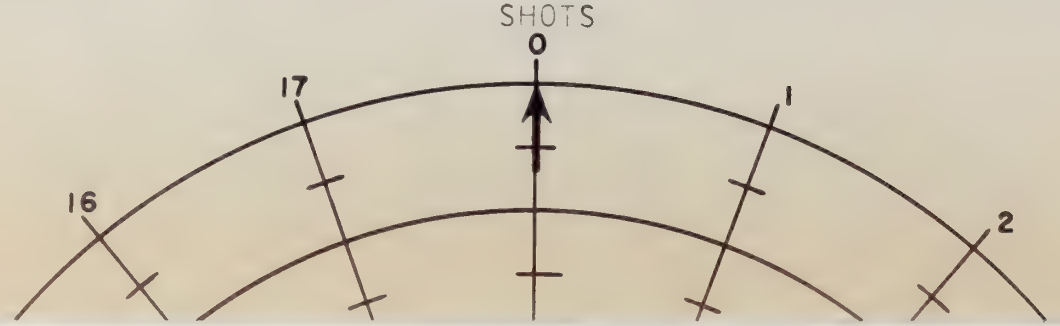
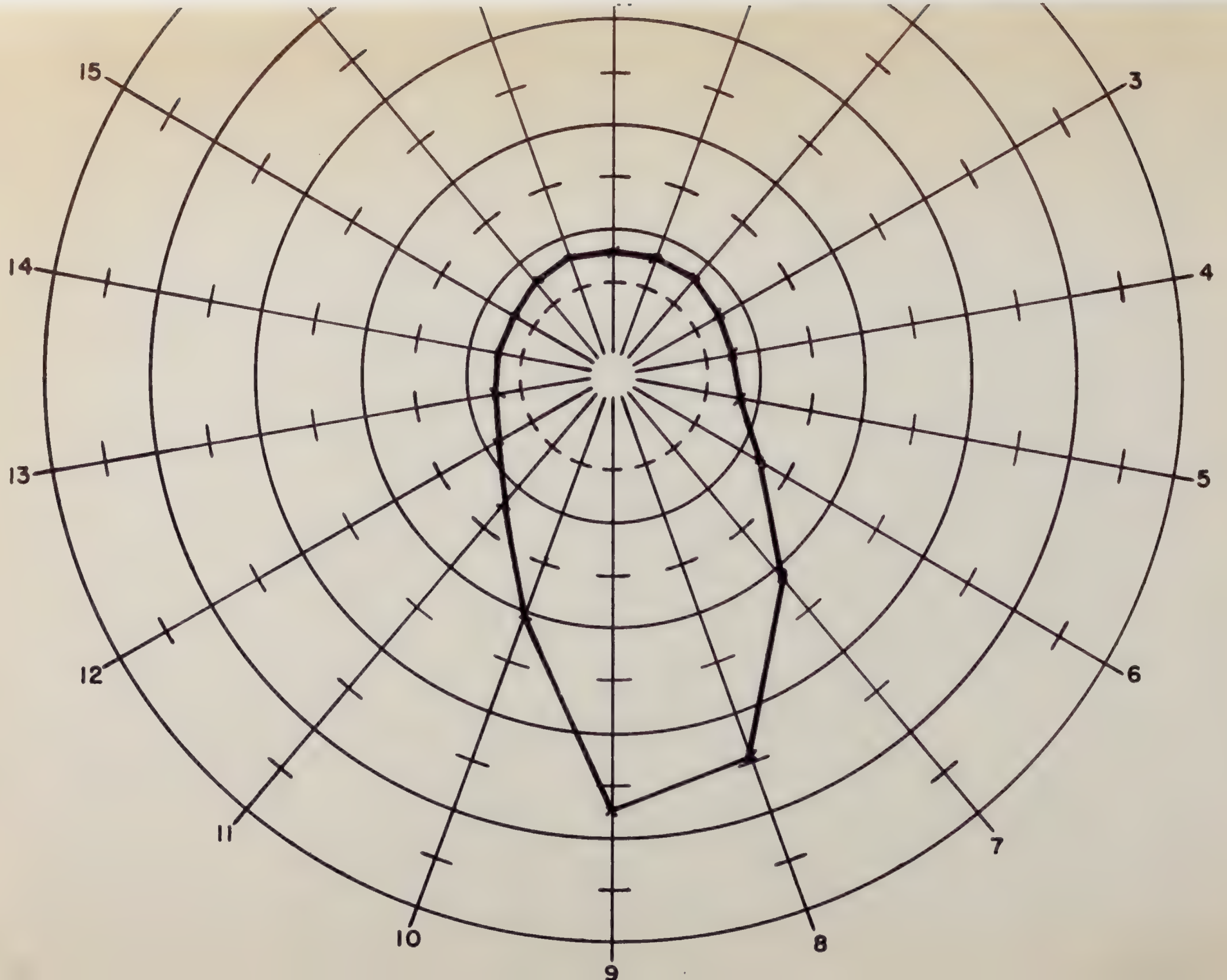
RADIORIENTATION PLOT

POT-B

NO.2 SHORT STRING PERFORATED 872-884 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME




15
3
14
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7
10
9
8

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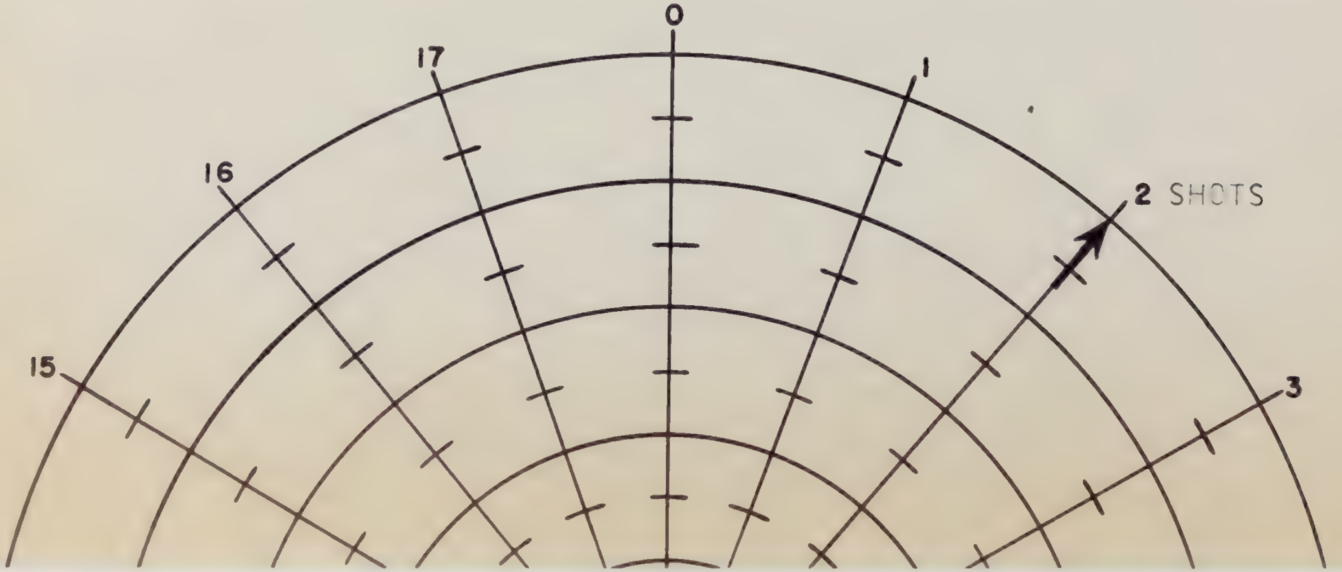
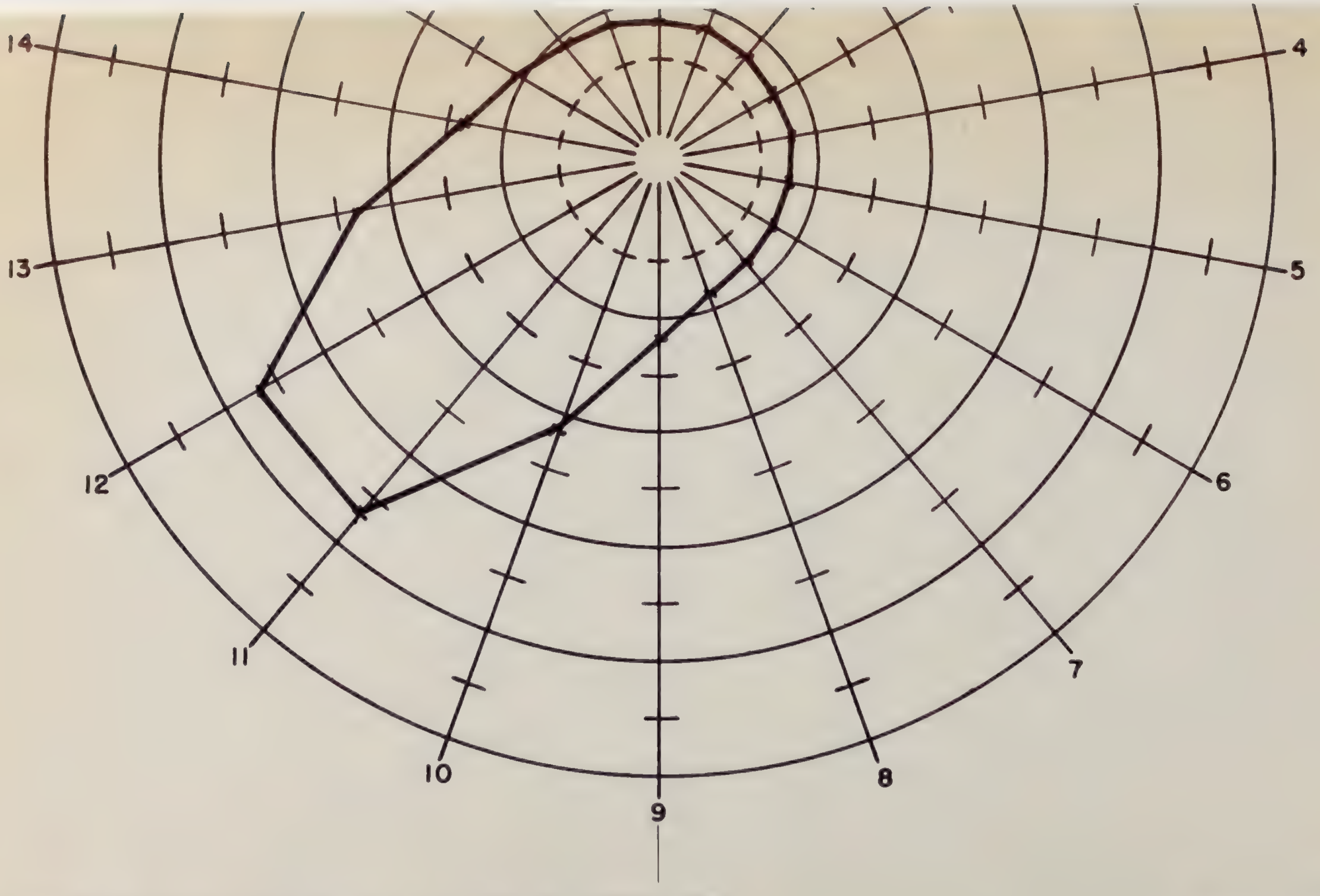
RADIORIENTATION PLOT

POT-B

NO.2 SHORT STRING PERFORATED 939-848 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





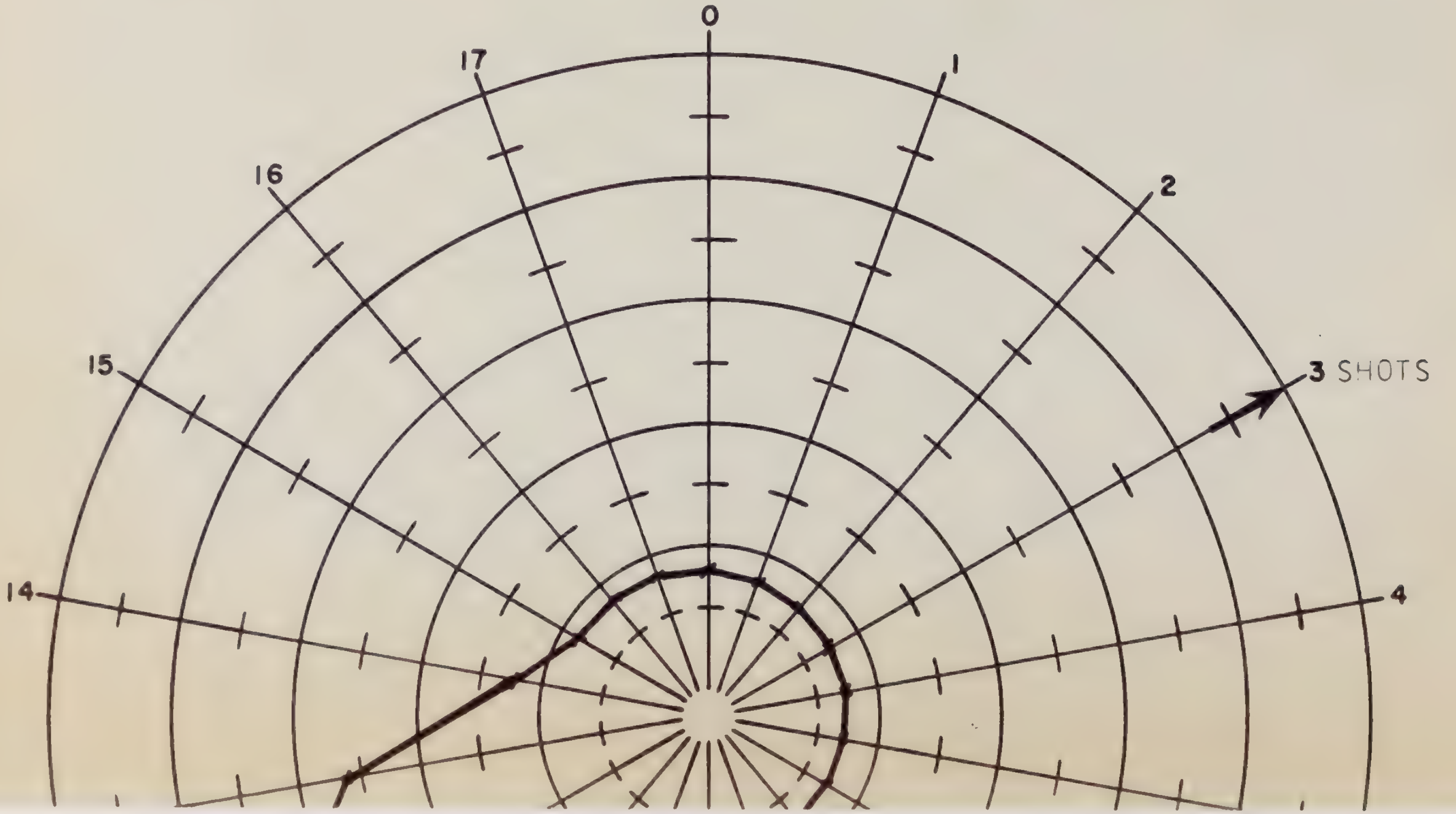
This chart, computation and/or interpretation of our readings from our gamma gamma orientation and detecting instrument is presented to you in accordance with but subject to the General [illegible] as are set out on pages [illegible] and [illegible] of our [illegible] side of [illegible]

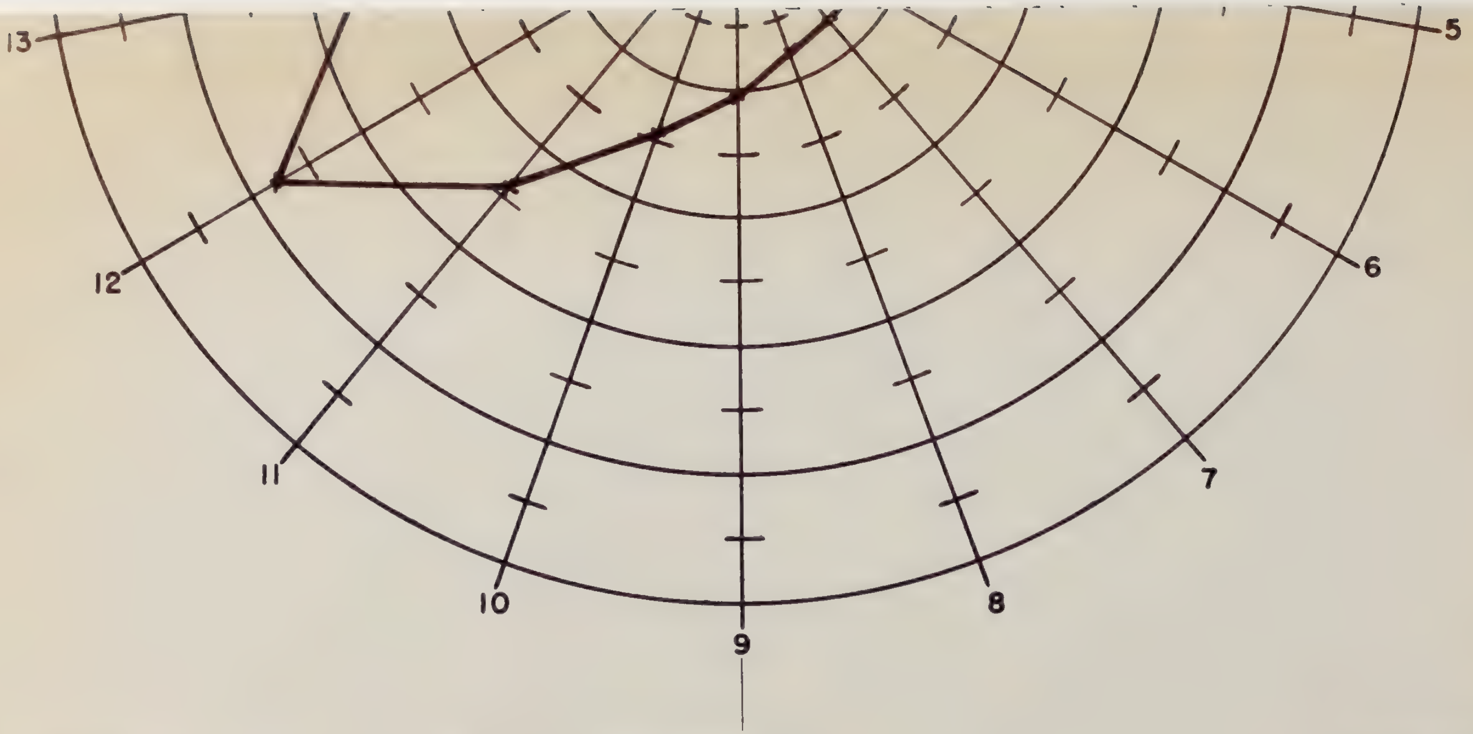
Schlumberger

RADIORIENTATION PLOT

POT-B

NO.2 SHORT STRING PERFORATED 827 837 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





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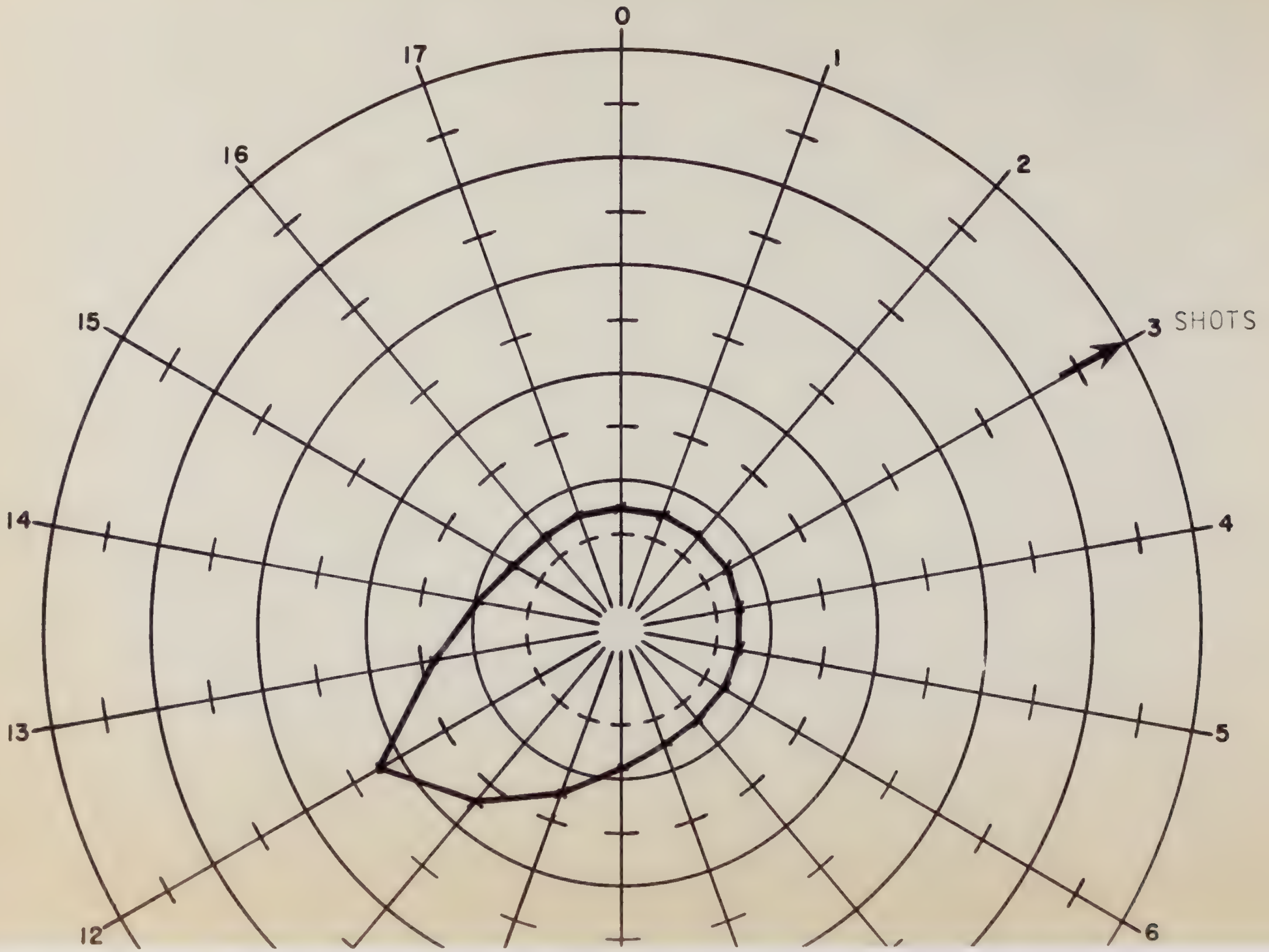
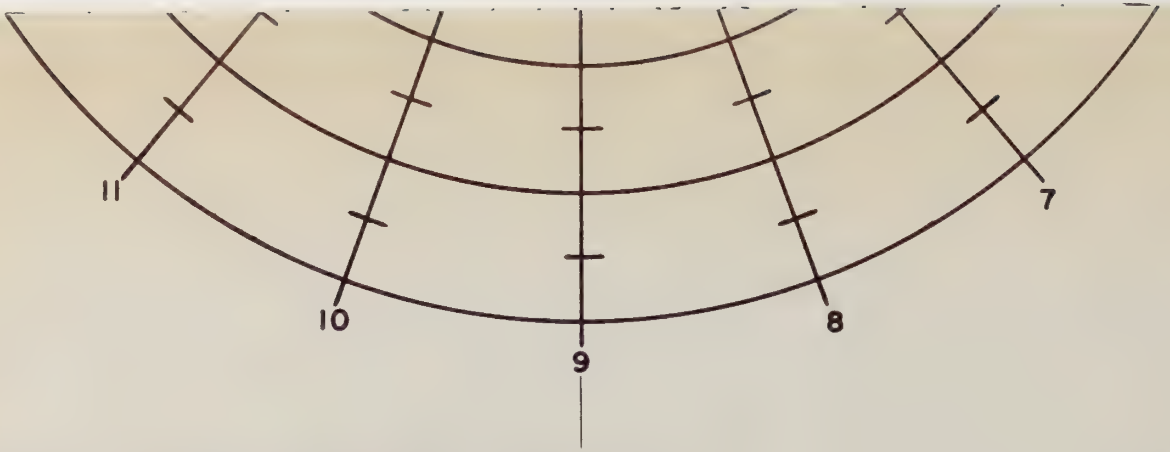
RADIORIENTATION PLOT

POT-B

NO.2 SHORT STRING PERFORATED 816-826 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





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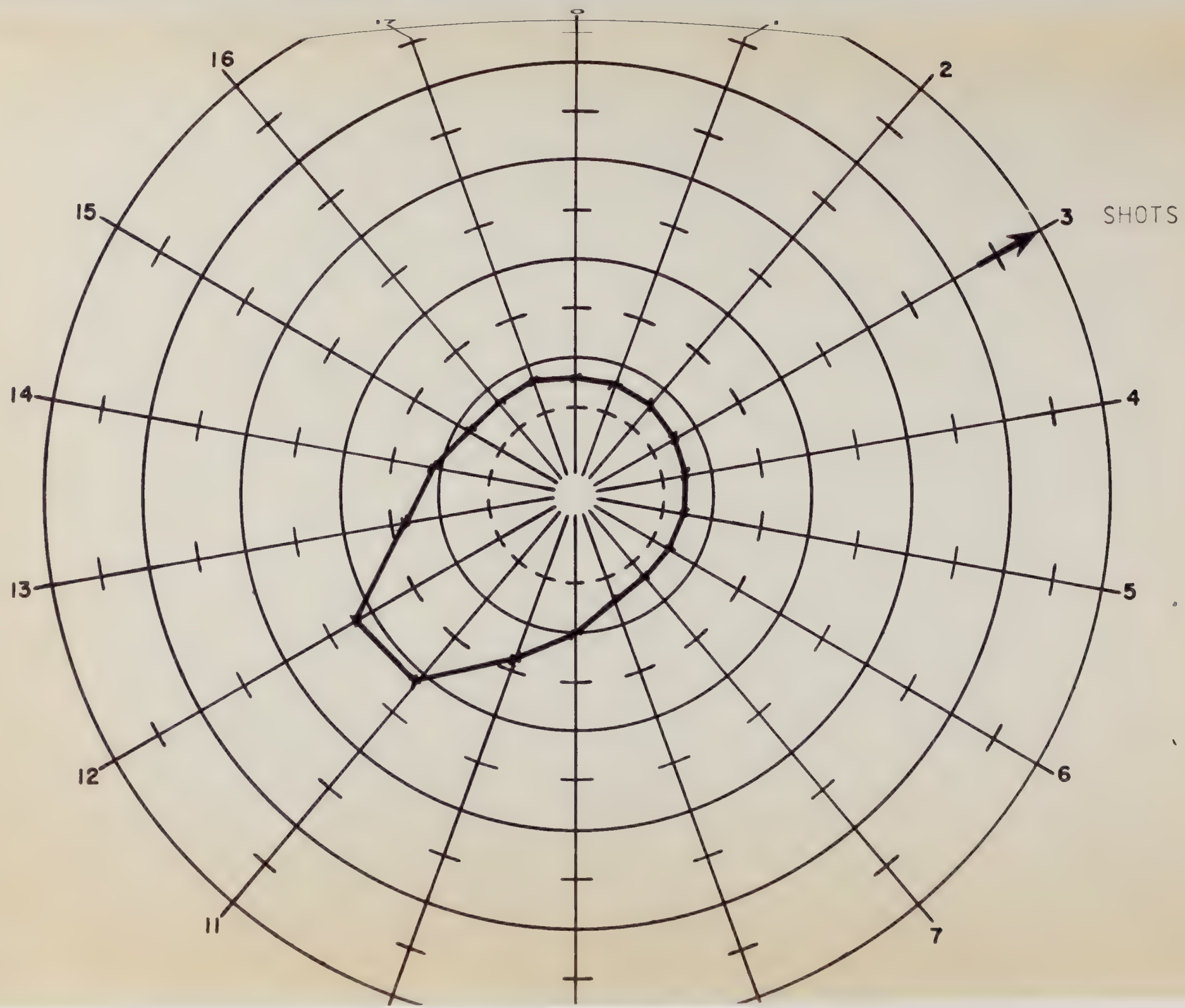
RADIORIENTATION PLOT

POT-B

NO.2-SHORT STRING PERFORATED ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME


0
2
3
SHOTS
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11
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16

This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by vagrant metal in the drill hole and other conditions unknown to us.

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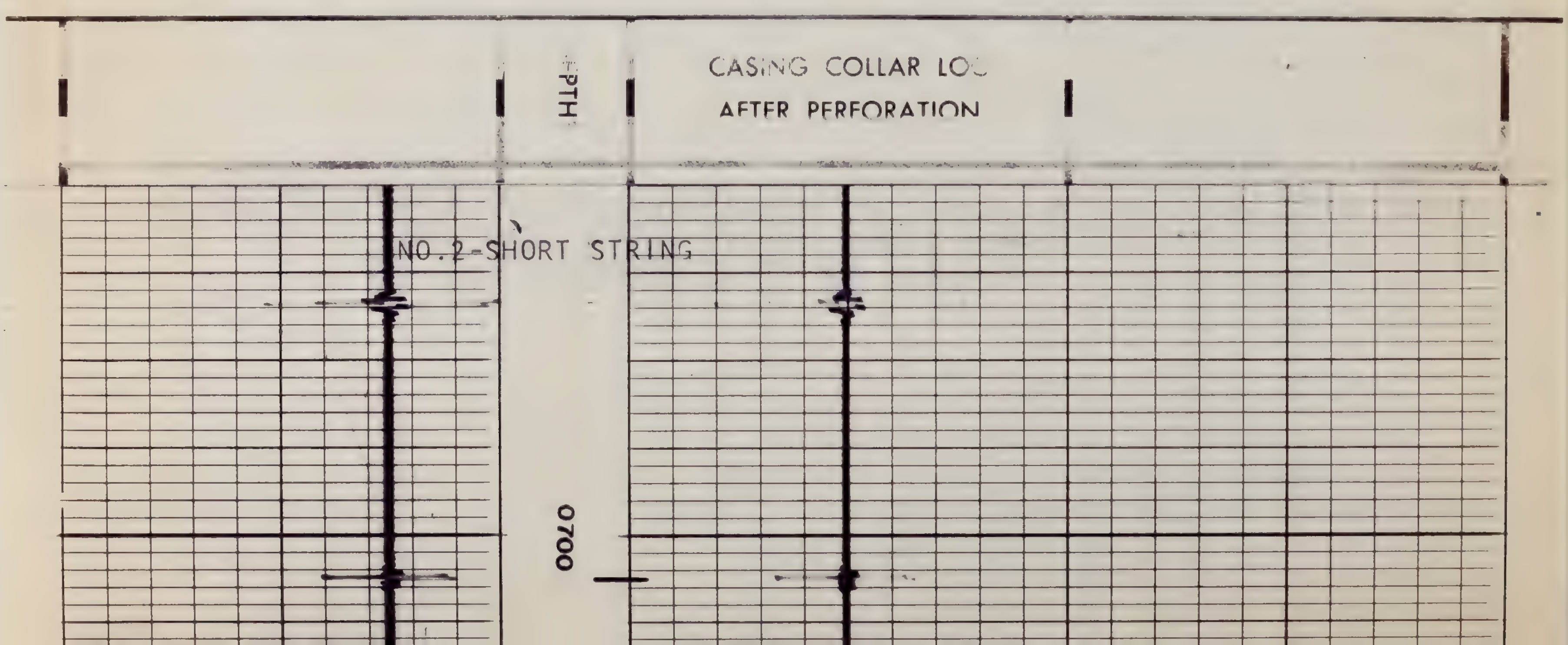
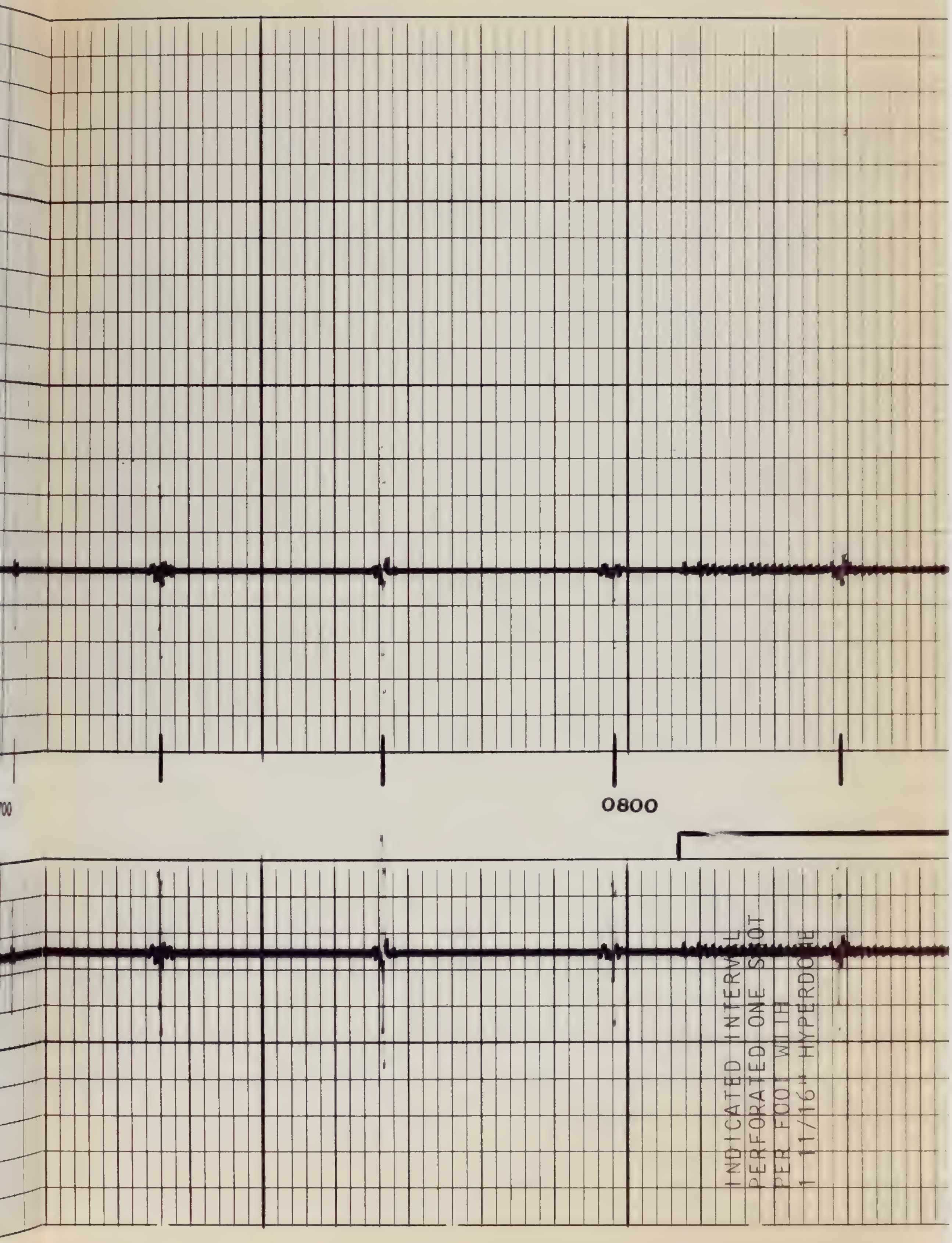
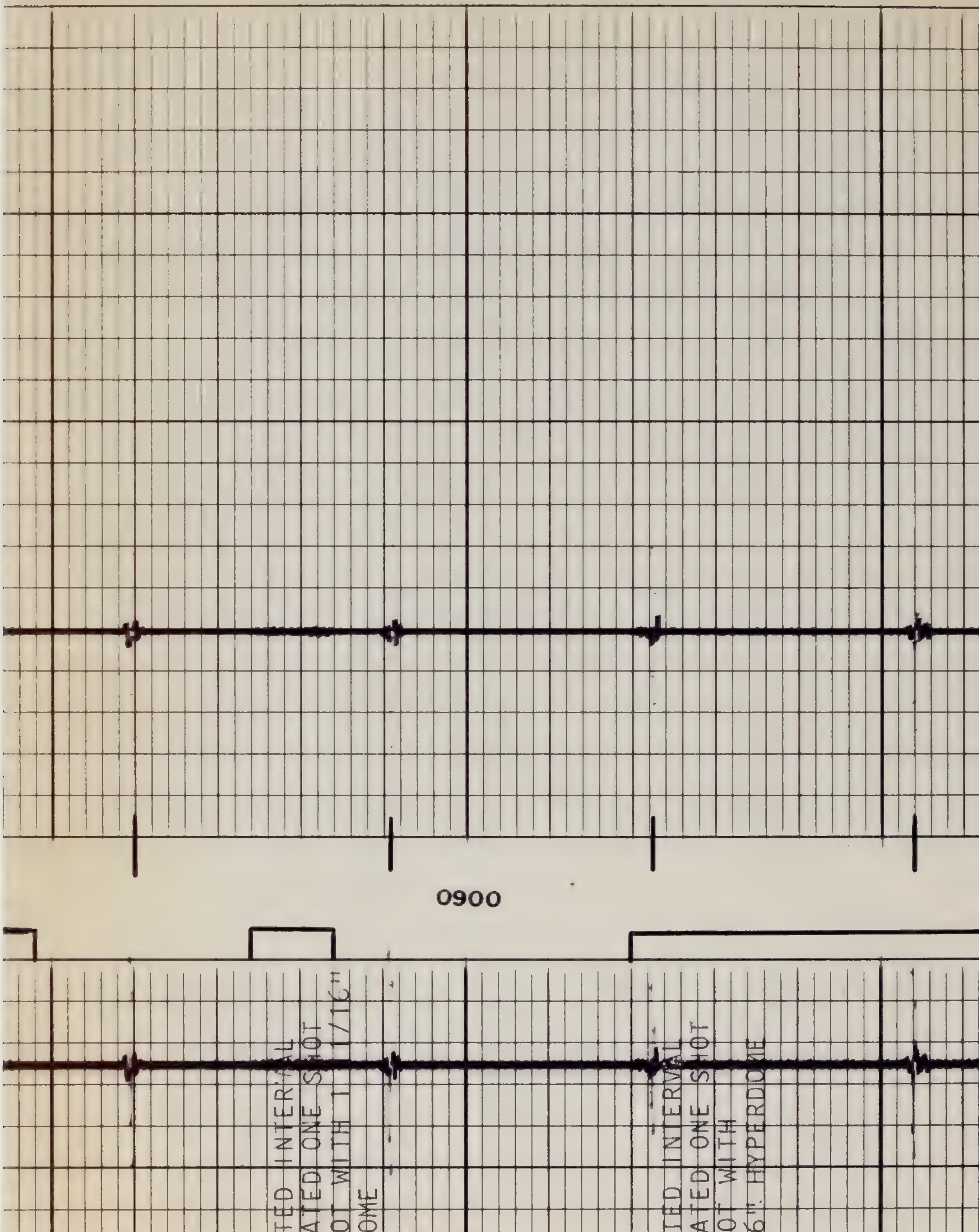
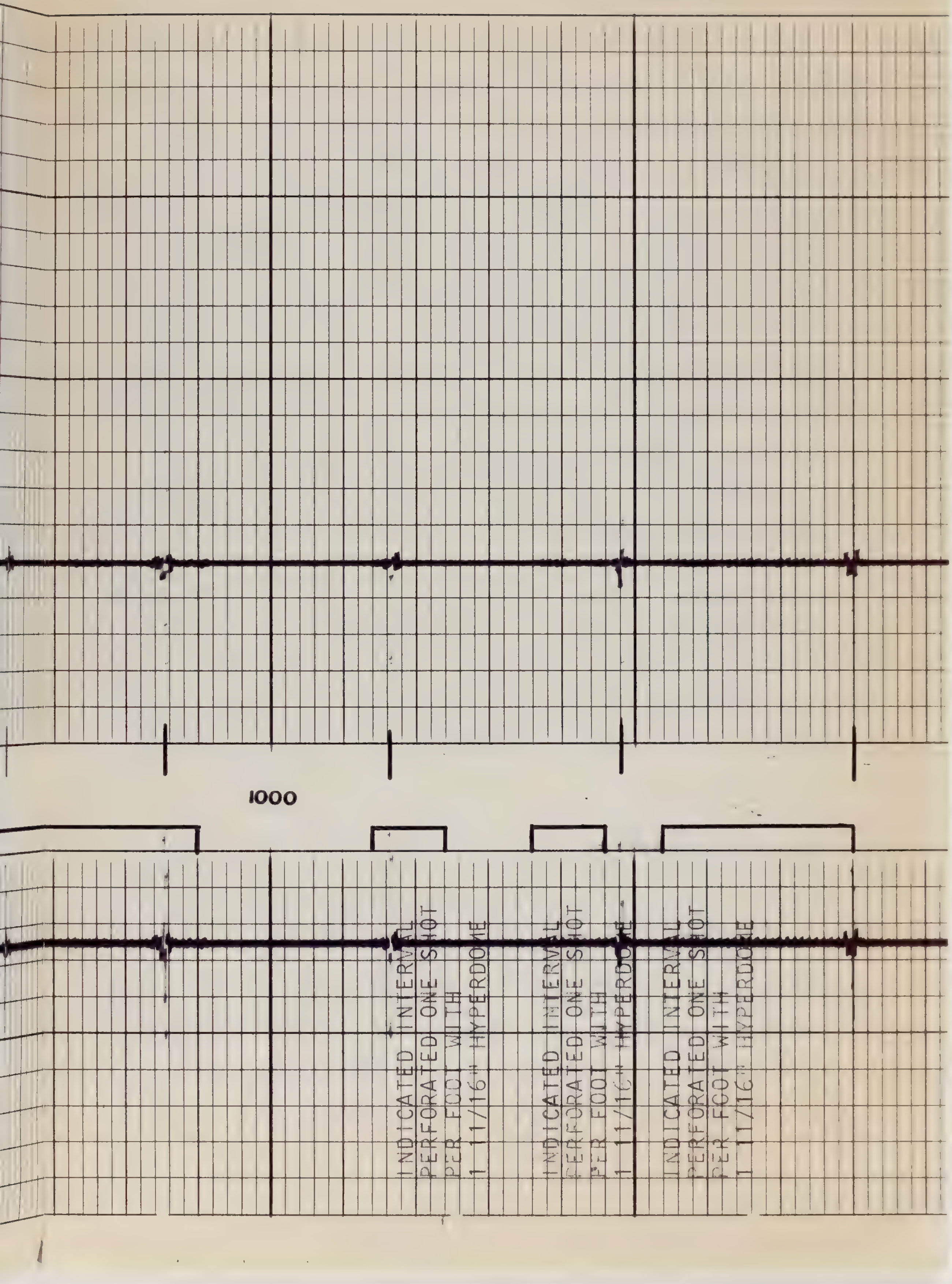
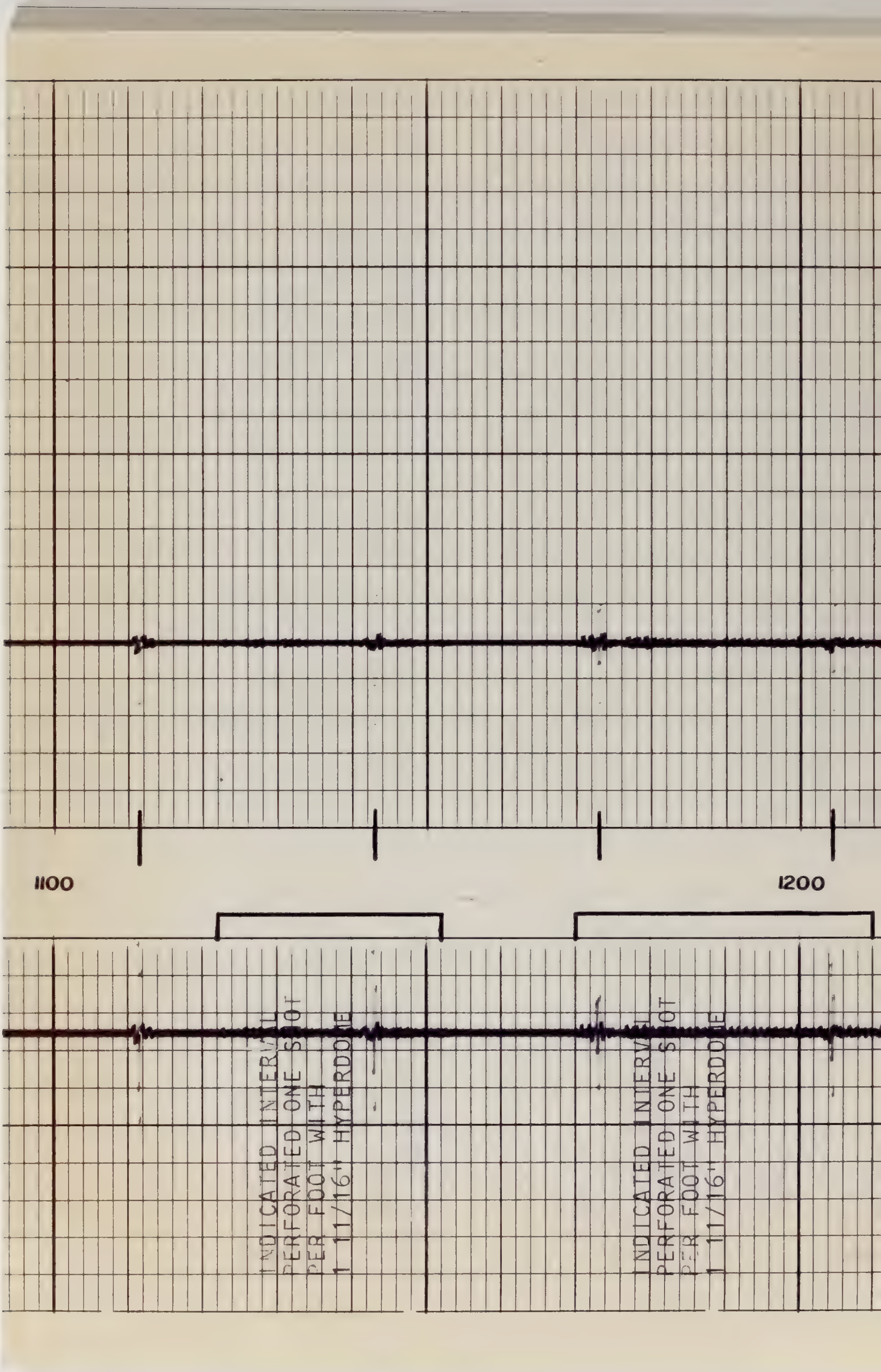
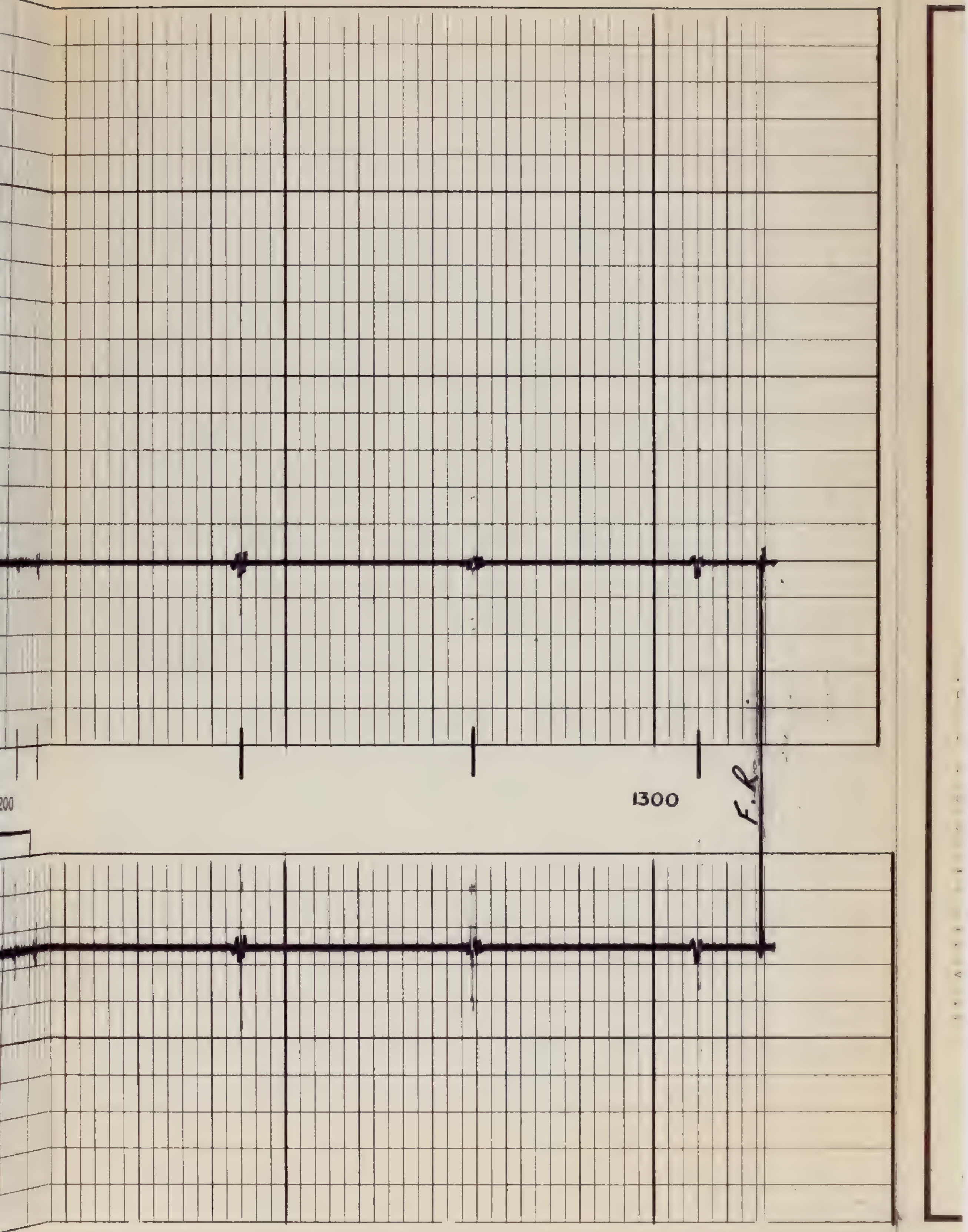



00
0800
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH
1 11/16" HYPERDOME


0900
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH 1 11/16"
HYPERDOME
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH
1 11/16" HYPERDOME


1000
INDICATED INTERVAL PERFORATED ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME
INDICATED INTERVAL PERFORATED ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME
INDICATED INTERVAL PERFORATED ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME


1100
1200
INDICATED INTERVAL PERFORATED ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME
INDICATED INTERVAL PERFORATED ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME


200
1300
F. R.

COMPANY [illegible]

WELL S.G. NO.9

FIELD

RIO BLANCO, COLORADO

Schlumberger

PRODUCTION LOGGING SERVICES

SWS-1425-B

Schlumberger

CEMENT BOND LOG

VDL-CCL

COUNTY RIO BLANCO
Field or LOCATION SORGHUM GULCH
WELL S.G. NO. 9
COMPANY ATLANTIC RICHFIELD COMPANY

COMPANY ATLANTIC RICHFIELD COMPANY

WELL S.G. NO.9

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

LOCATION API Serial No.

Sec. 11 Twp. 3S Rge. 97W

Other Services:
[illegible]

Permanent Datum: GROUND LEVEL, Elev. 6870
Log Measured From GL, 0 Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B. ----
D.F. ----
G.L. 6870

Date	10/29/74		Type Drill Fluid	WATER	
Run No.	NO.1STRING	NO.2STR.	Fluid Level	FULL	
Depth — Driller	----	----	Max. Rec. Temp.	---- °F	
Depth — Logger	2720	1338	Est. Cement Top	830	
Btm. Log Interval	2712	1330	Equip. | Location	3862	VERNAL
Top Log Interval	700	700	Recorded By	ST. AUBYN	
Open Hole Size	7 7/8		Witnessed By	MR. BURNS	

CASING REC.	Size	Wt/Ft	Grade	Type Joint	Top	Bottom
Surface String	8 5/8			T&C	SURF	65
String (1)	2 3/8	4.7		T&C	SURF	2740
String (2)	2 3/8	4.7		T&C	SURF	1330
Liner						

PRIMARY CEMENTING DATA

STRING	Surface	Protection	Production	Liner
Vol. of cement			425 SKS	
Type of cement			HOWCO LT. WT.	
Additive			10#/SK-GILSONITE	
Retarder				
Wt. of slurry				
Water loss				
Type fluid in csg.				
Fluid wt.				

FOLD HERE

The well name, location and borehole reference data were furnished by the customer.

PRIMARY CEMENTING PROCEDURE

	Hour — date	Hours from start of operation
Started pumping cement	22:30-10/25/74	
Release pressure	23:30-10/25/74	
Start Cement Bond Log	08:00-10/29/74	
Finish Cement Bond Log	19:00-10/29/74	

REMARKS

Service Order No. 2

Csg. Collars Recorded 15 ft. DEEP

Preceding fluid________ Volume________ bbls.

Cement pumped________ bbls./minute

Pipe reciprocated during Pumping: Yes______ No______

Pipe reciprocated after plug down: Yes______ min., No______

SQUEEZE JOB DETAIL

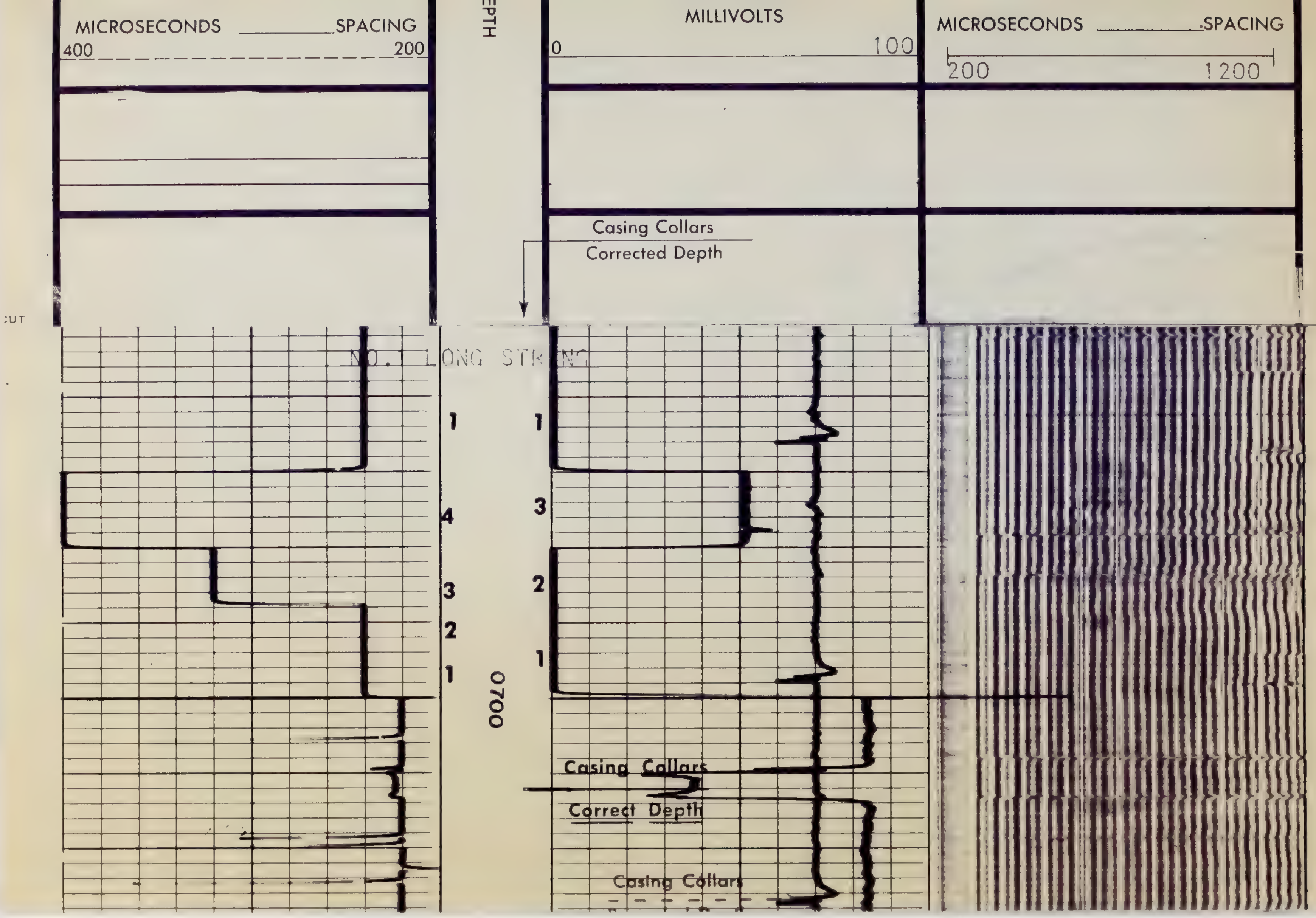
Squeeze number	1	2
Date		
Depth interval		
Type cement		
Volume of cement		
Additive		
Retarder		
Weight of slurry		
Preceding fluid		
Breakdown pressure		
Max. pressure-stage 1		
" " " 2		
" " " 3		
Final maximum pressure		
Started pumping cement		
Released pressure		
Start CBL		
Finish CBL		

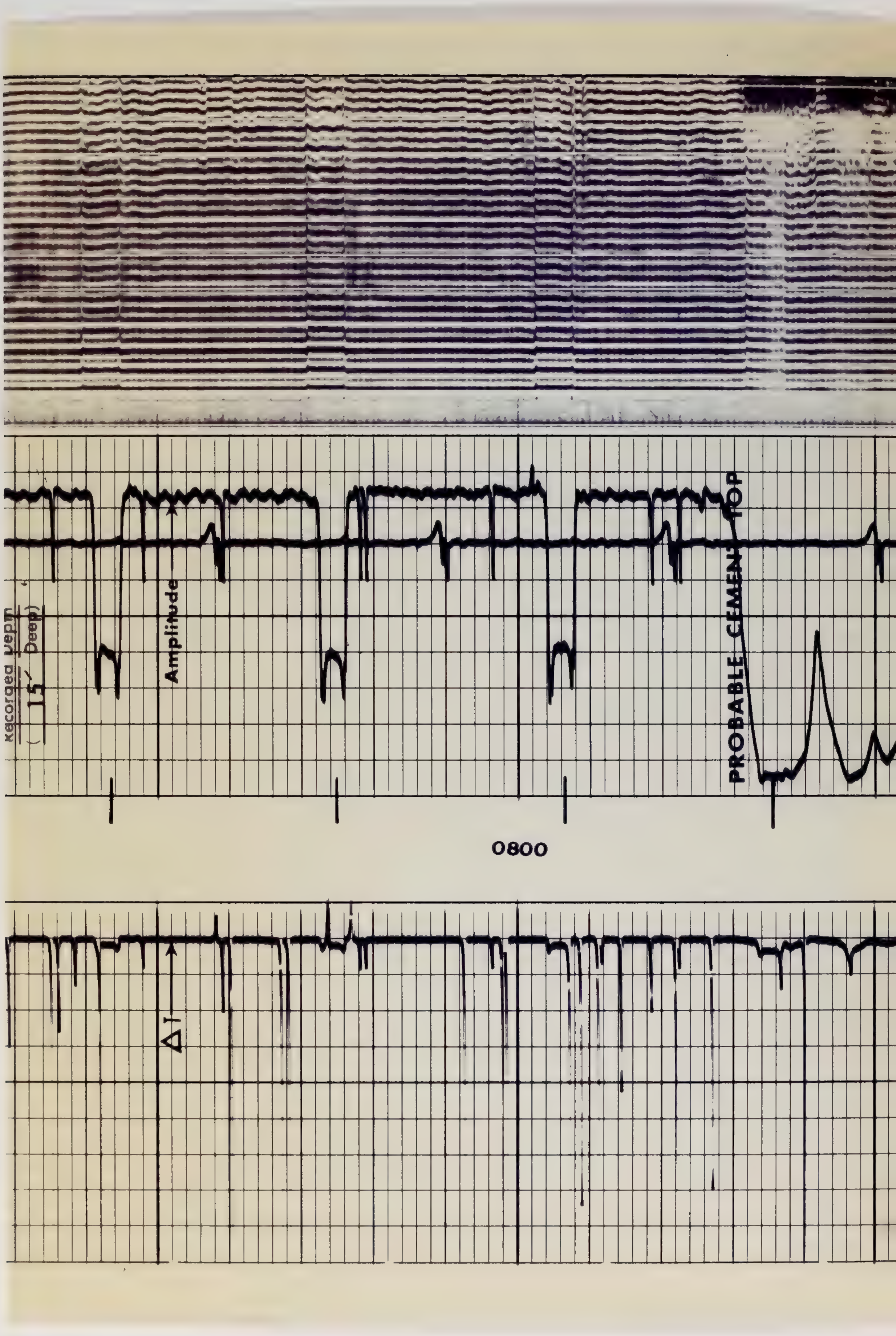
AVERAGE WELL DRIFT:

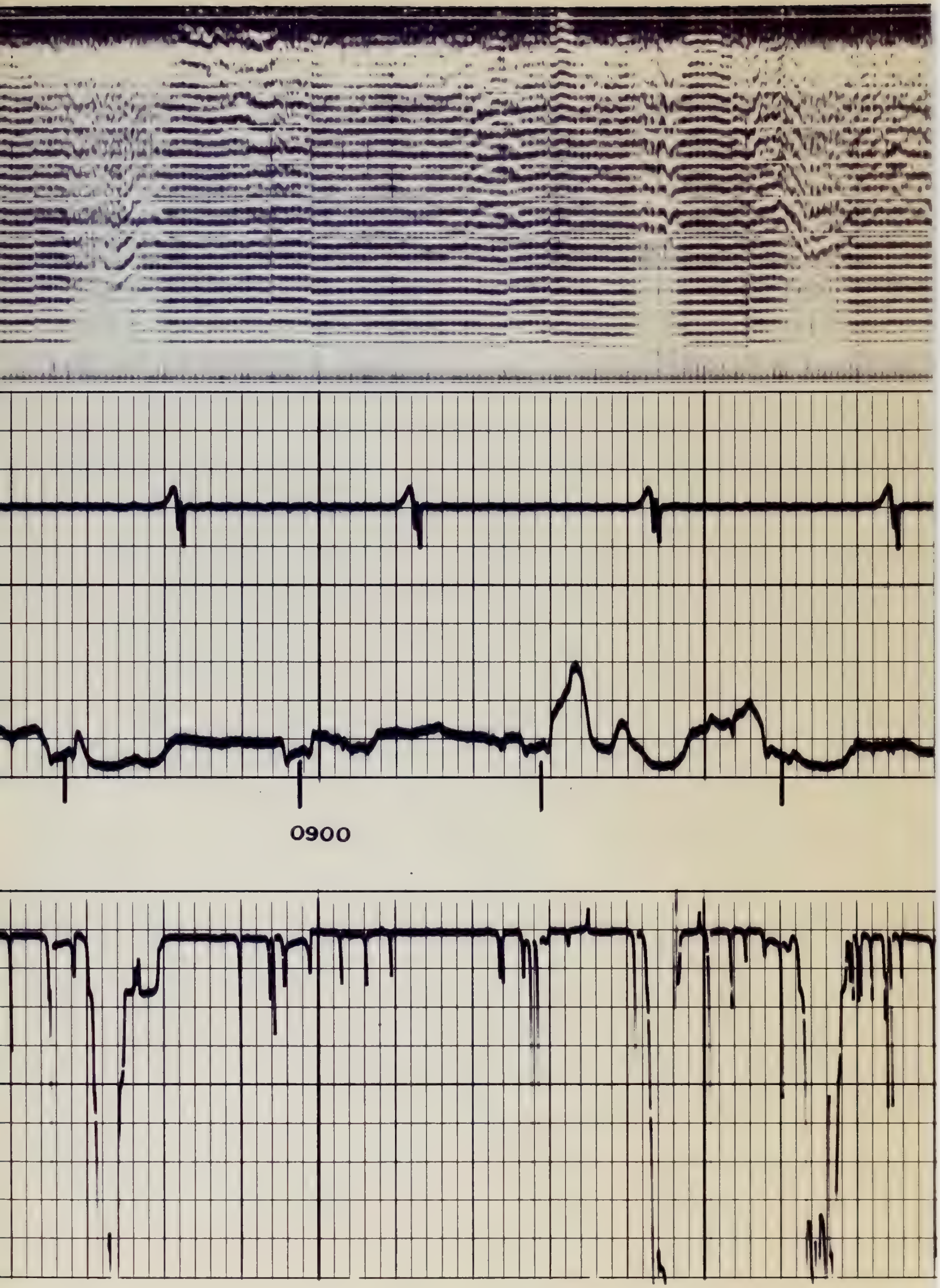
° from to ; ° from to ; ° from to

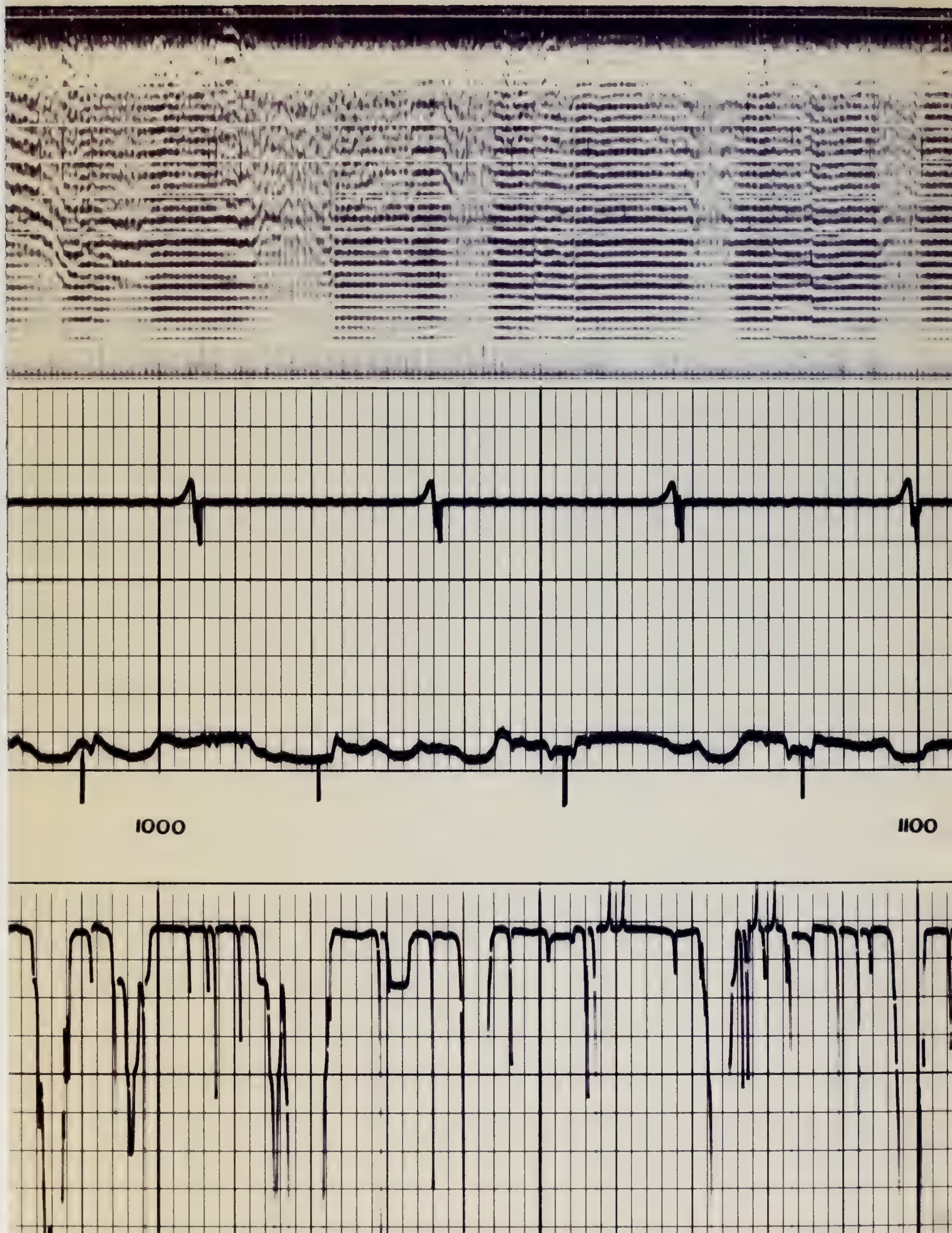
EQUIPMENT DATA

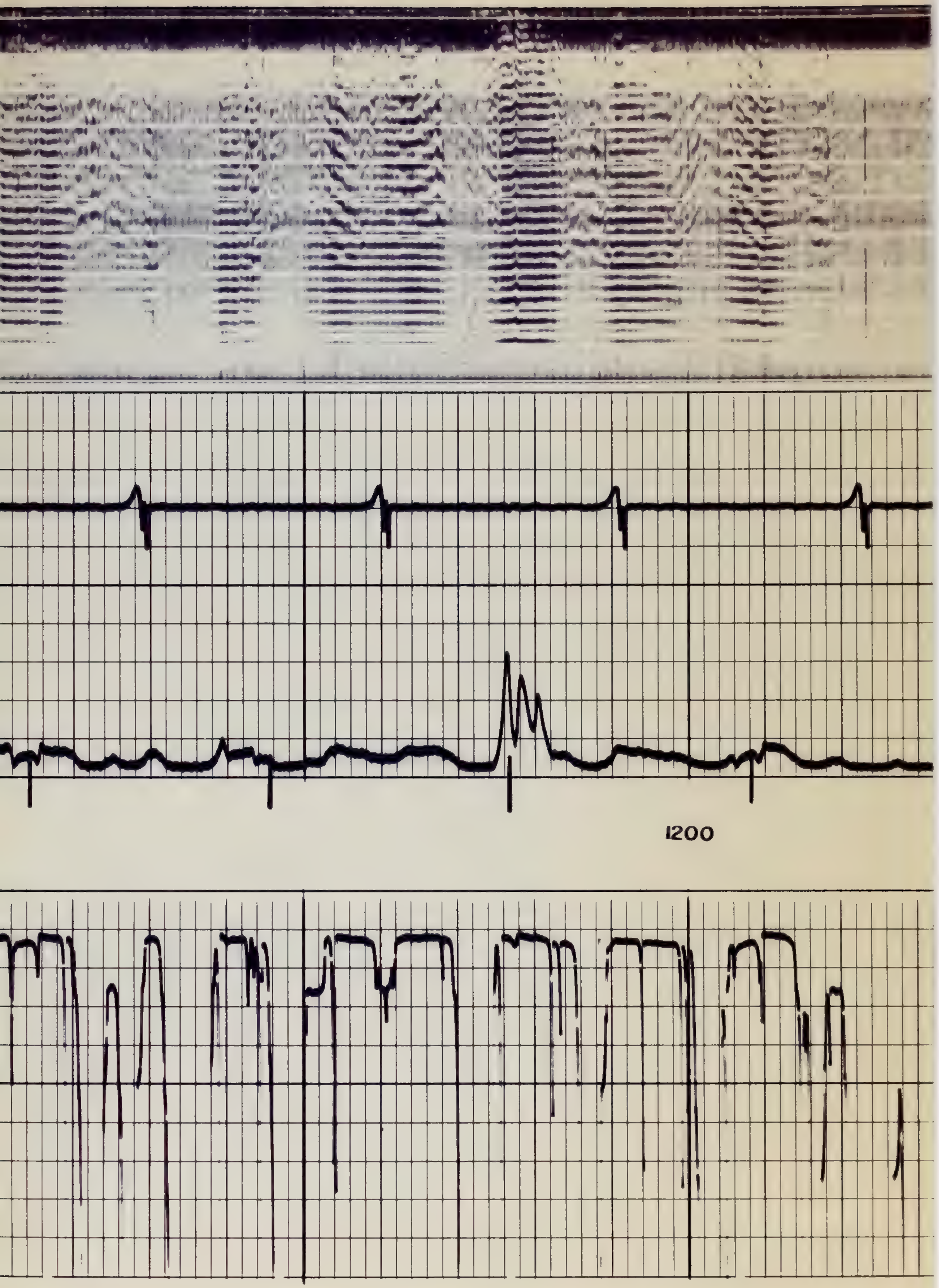
EQUIPMENT DATA	Centralizer Depths	Scratcher Depths
Sonic Panel No.	SLP-FH #37	
Sonic Cart No.	SLC-JD #83	
Sonic Sonde No.	SLS-JC #81	
CRP No.	14	
Mem Panel No.	----	
GR Panel No.	----	
GR Cart No.	----	
Centralizer: Type	CME-V	CAL-AJ
No.	CME-W	
To Level (MV)	100	
Cart. Gain	1/20	
CRP Intensity	.1	
R9G Intensity	7 3/4	
Logging Speed	30 FPM	
Time Constant		

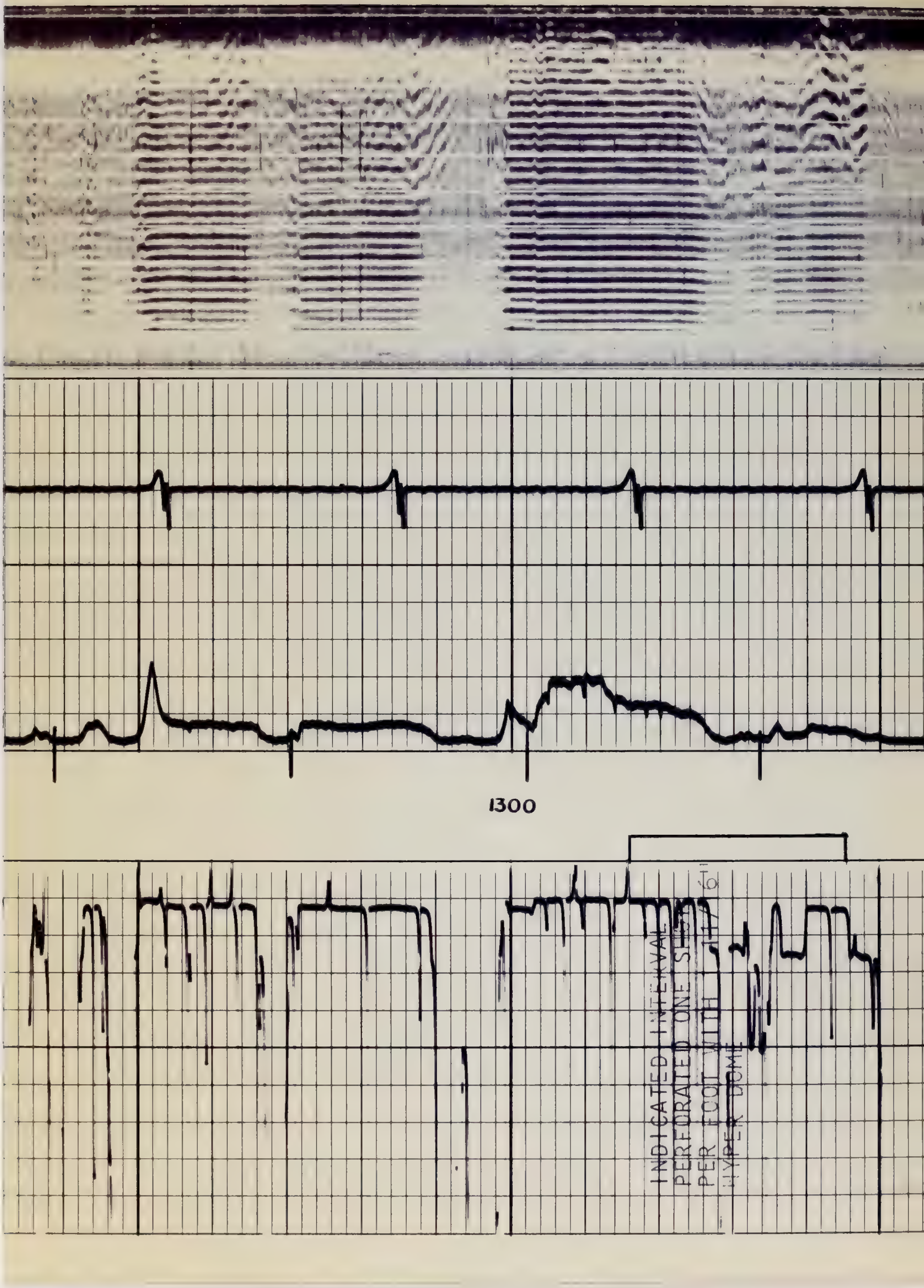

MICROSECONDS
SPACING
400
200
EPTH
MILLIVOLTS
0
100
MICROSECONDS
SPACING
200
1200
Casing Collars
Corrected Depth
UT
NO. 1 LONG STRING
1
4
3
2
1
1
3
2
1
0700
Casing Collars
Correct Depth
Casing Collars

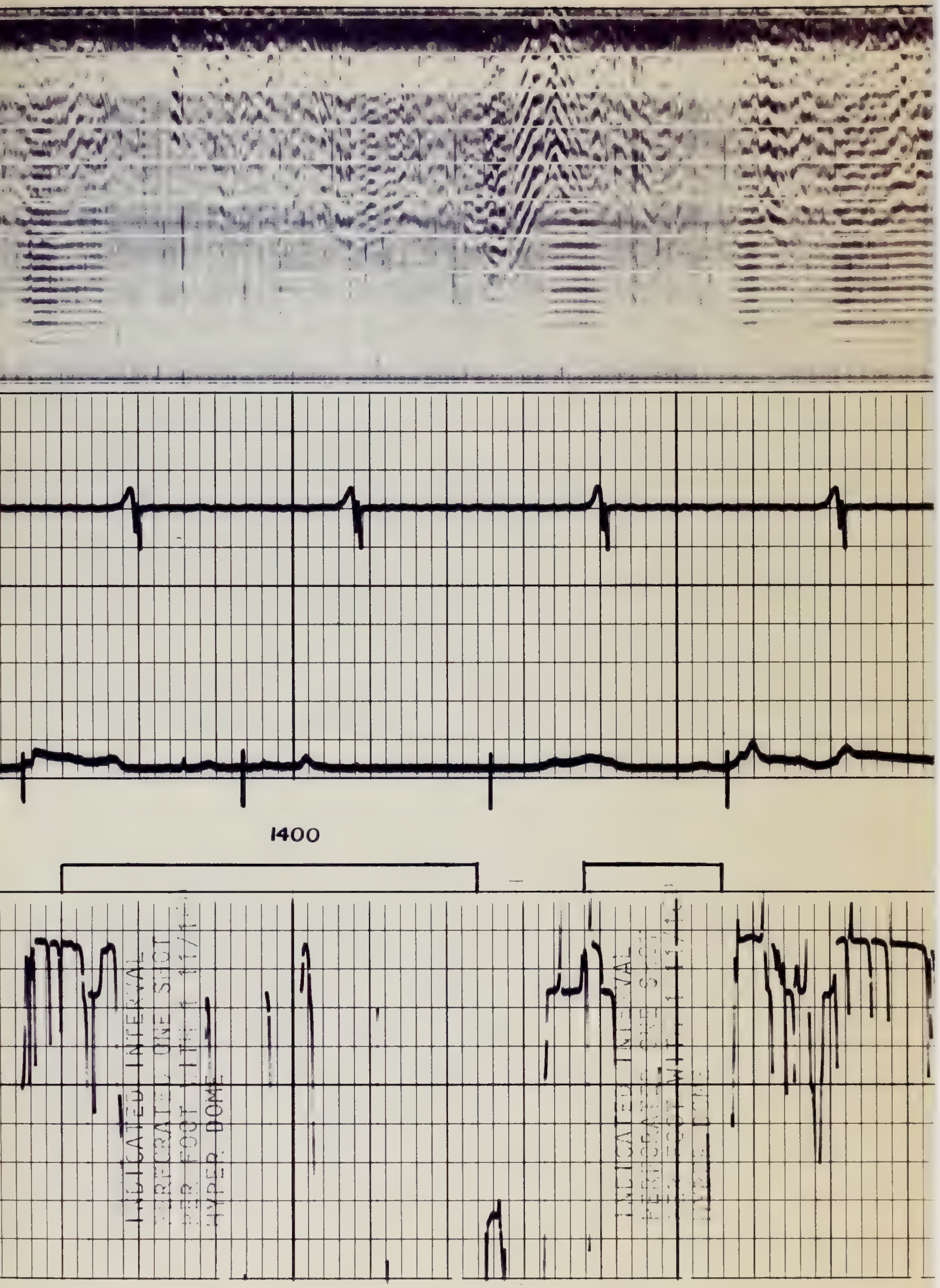

Recorded Depth
(15' Deep)
Amplitude
PROBABLE CEMENT TOP
0800
ΔT

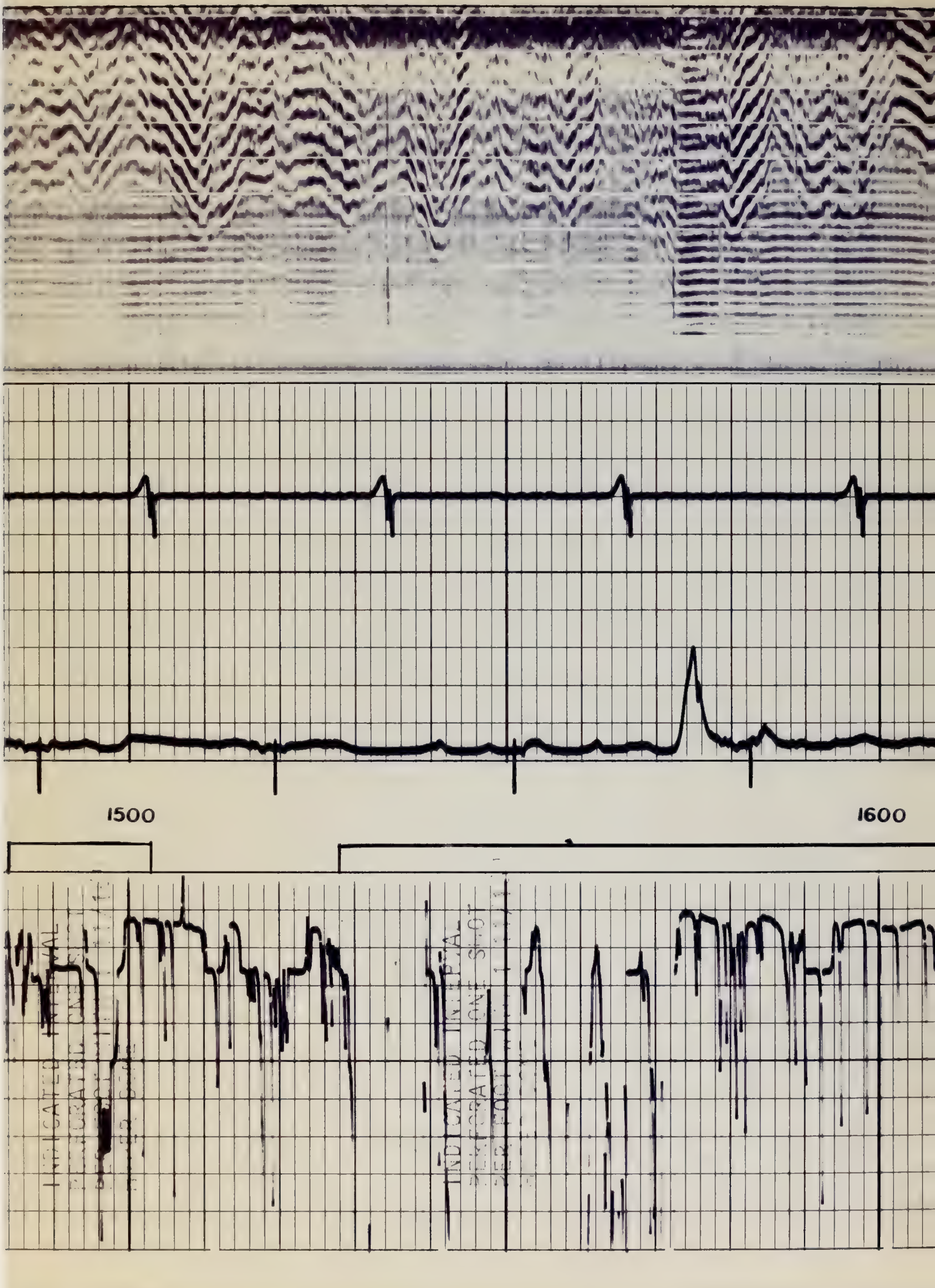

0900

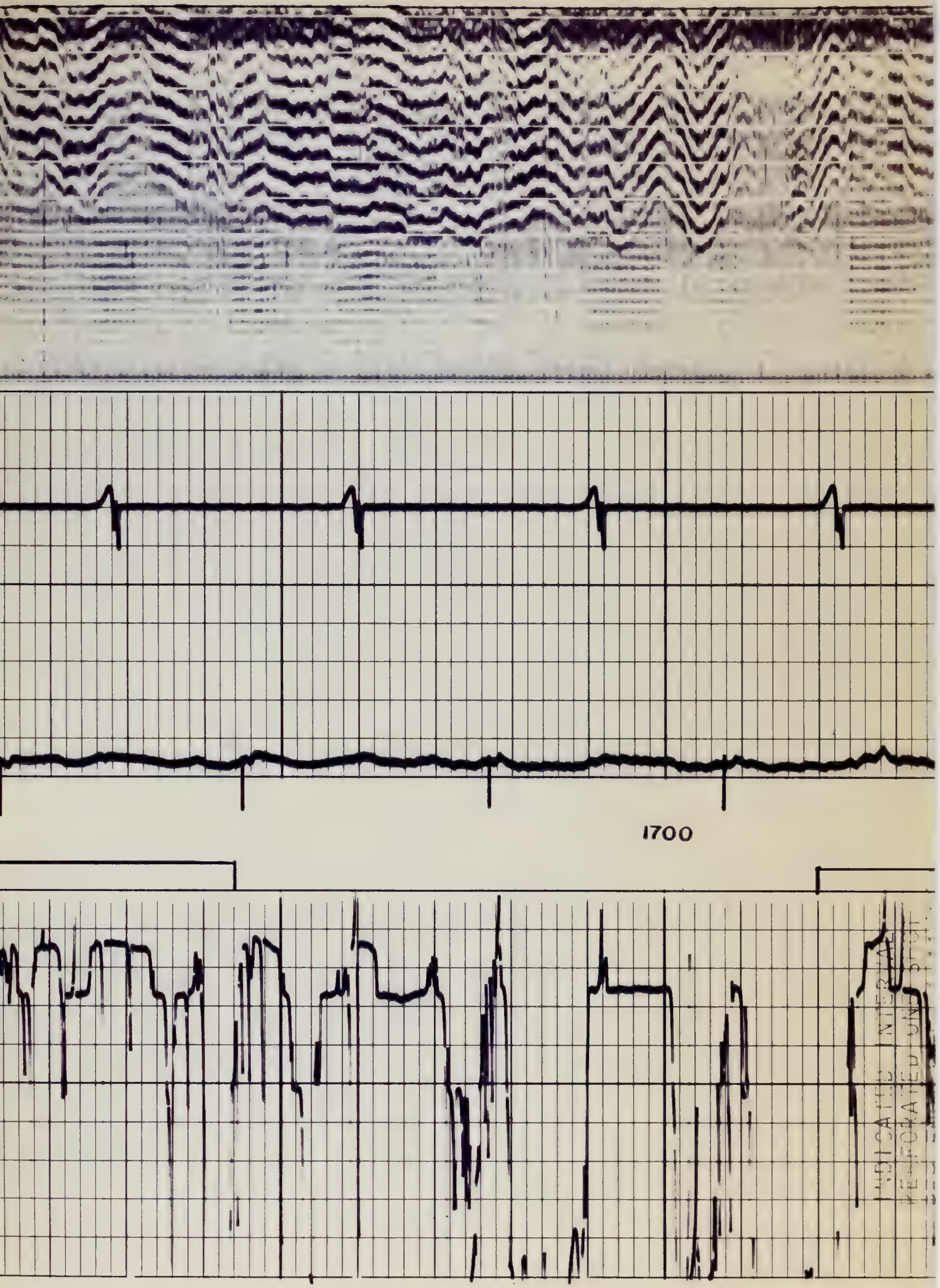

1000
1100

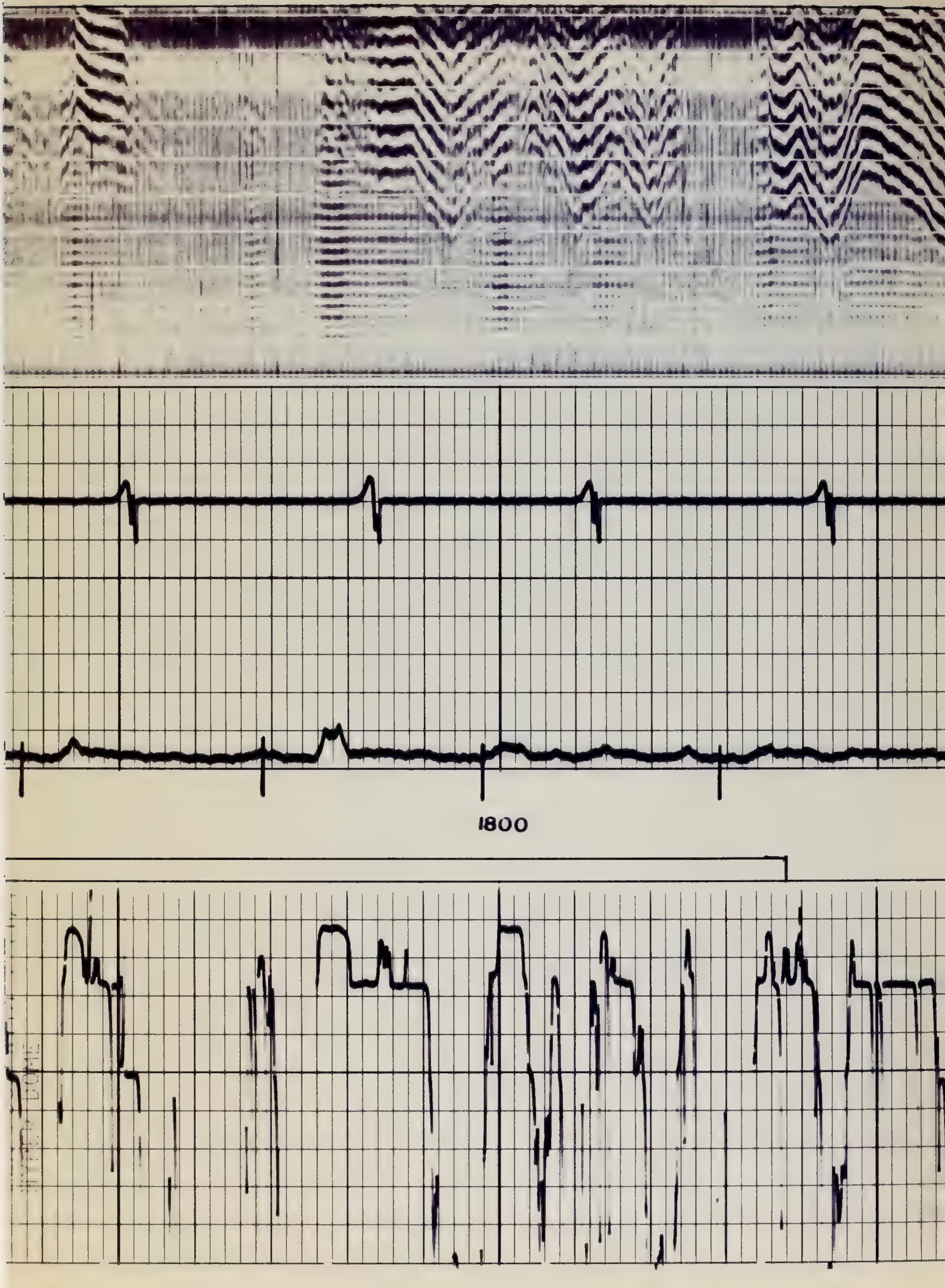

1200

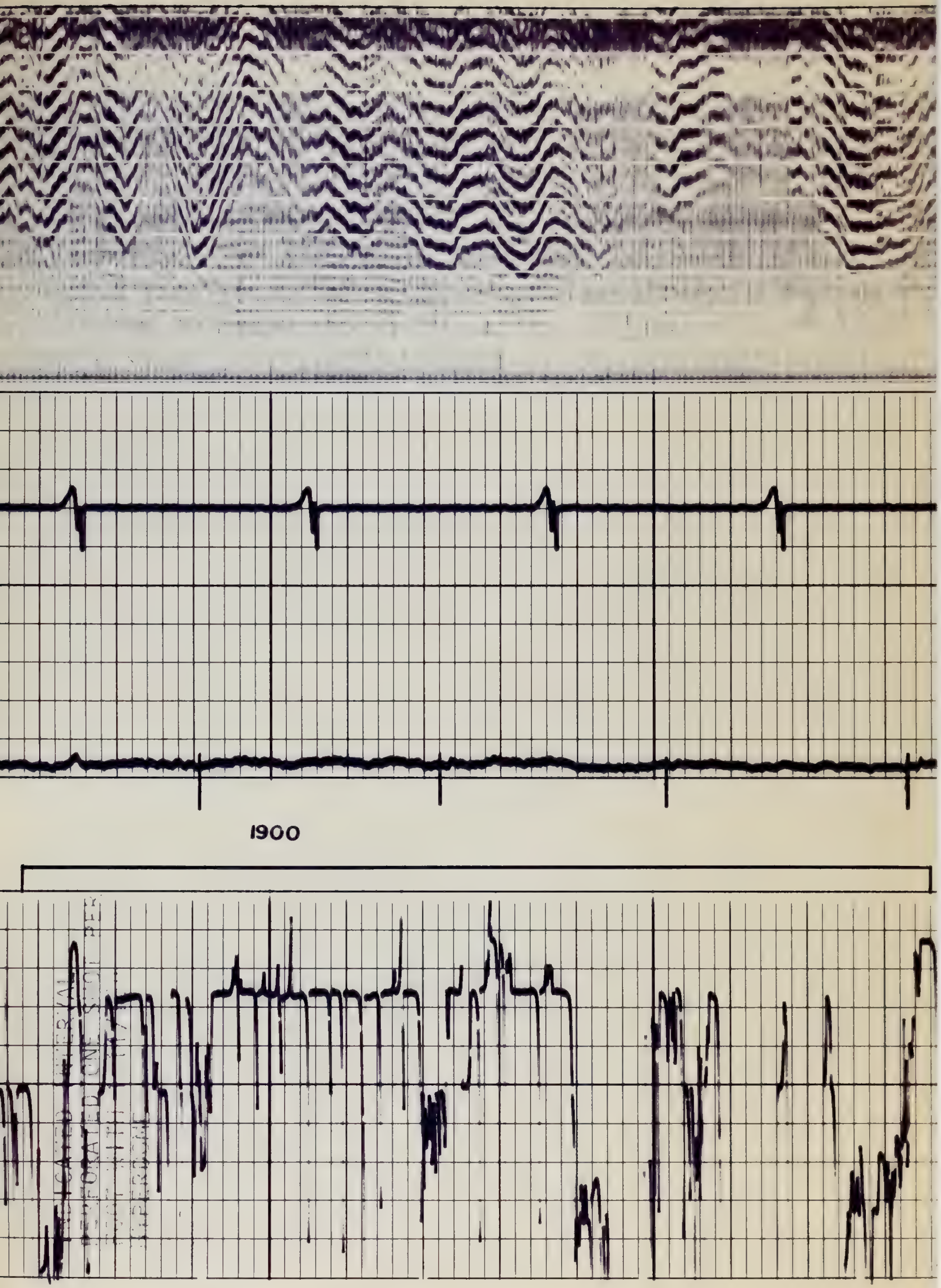

1300
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH 1 11/16"
HYPER DOME

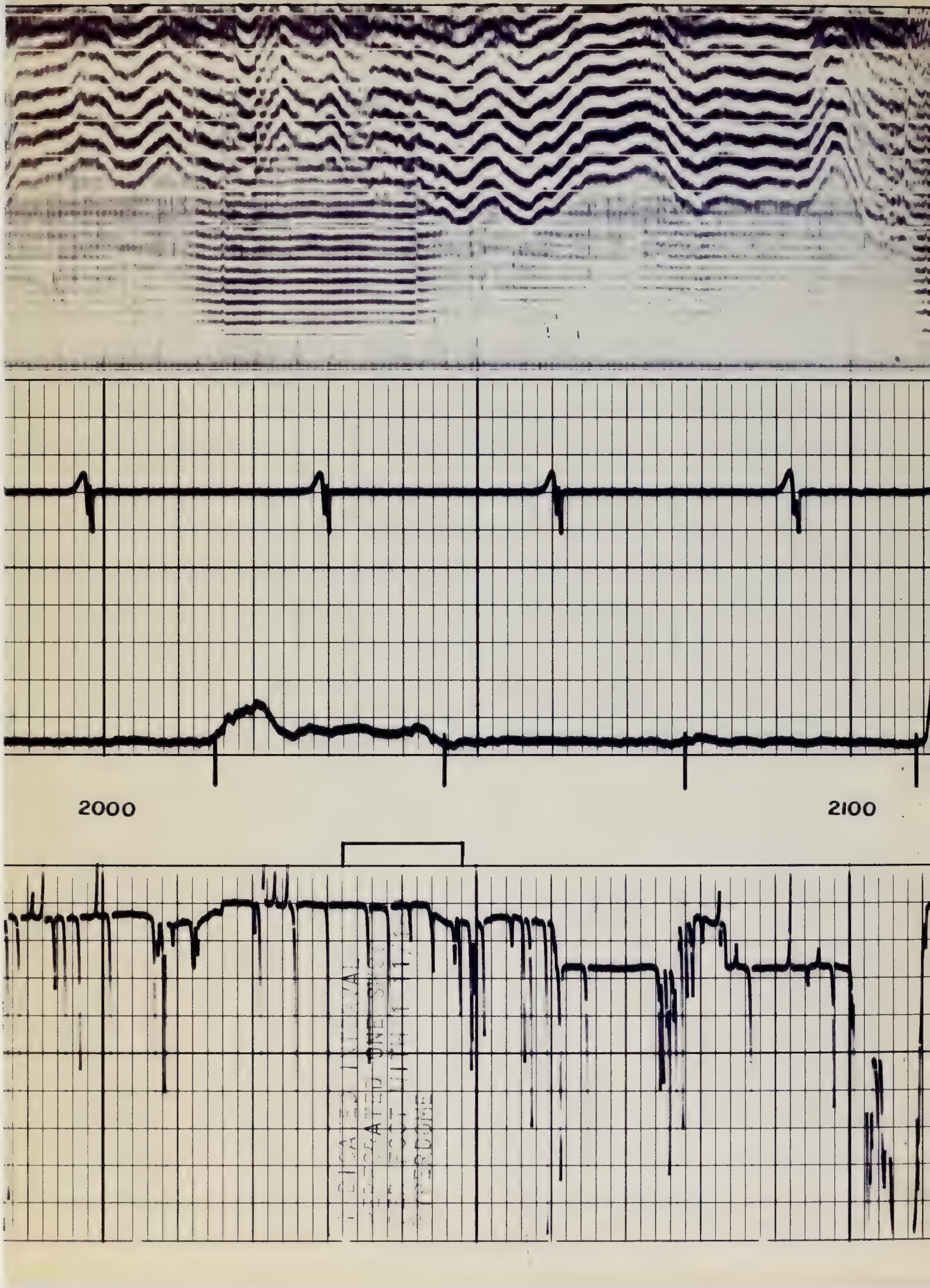

1400
INDICATED INTERVAL
PERFORATED, ONE SHOT
PER FOOT WITH 1 11/16"
HYPER DOME
INDICATED INTERVAL

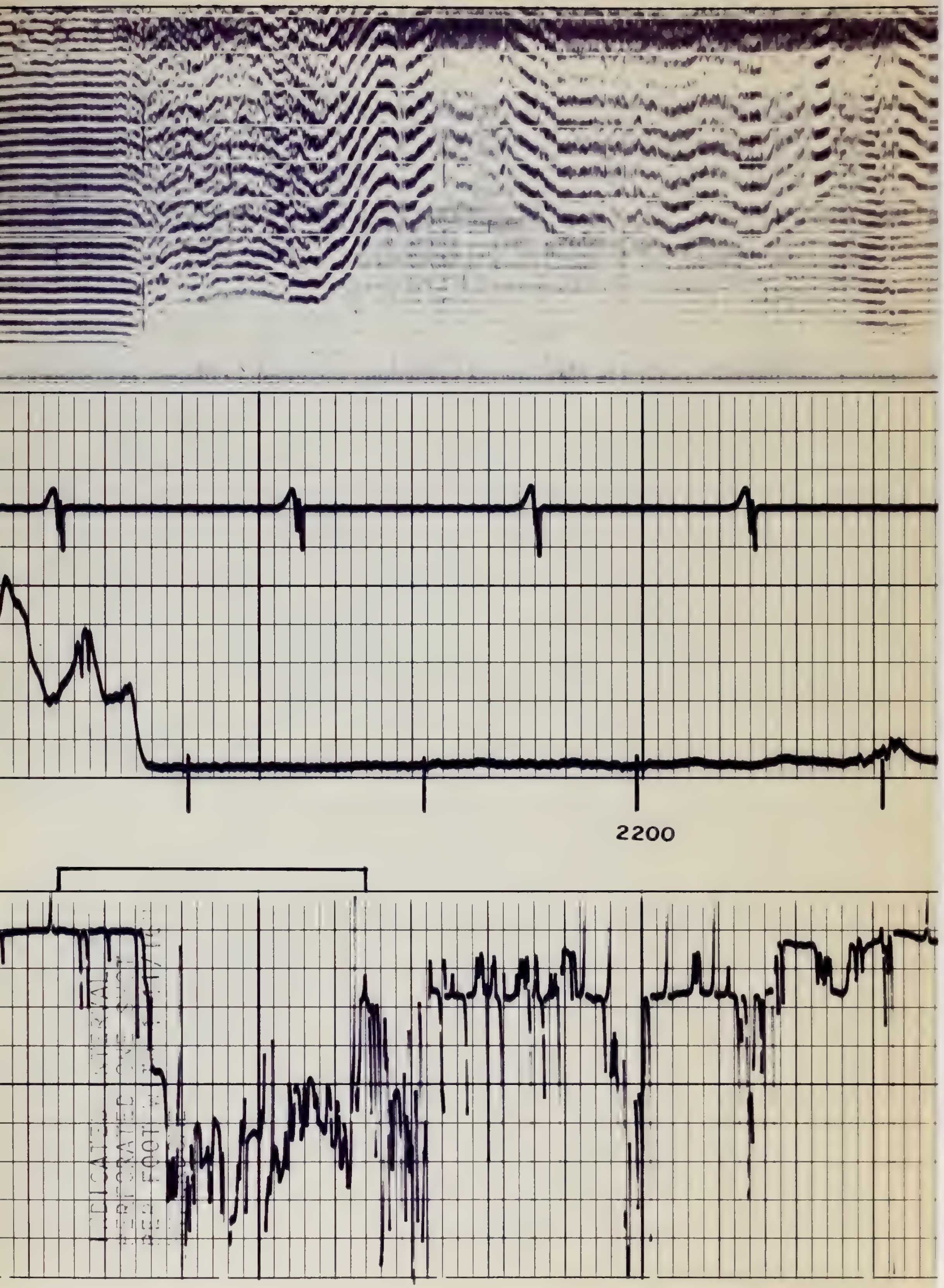

1500
1600
INDICATED INTERVAL
PERFORATED ONE
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT

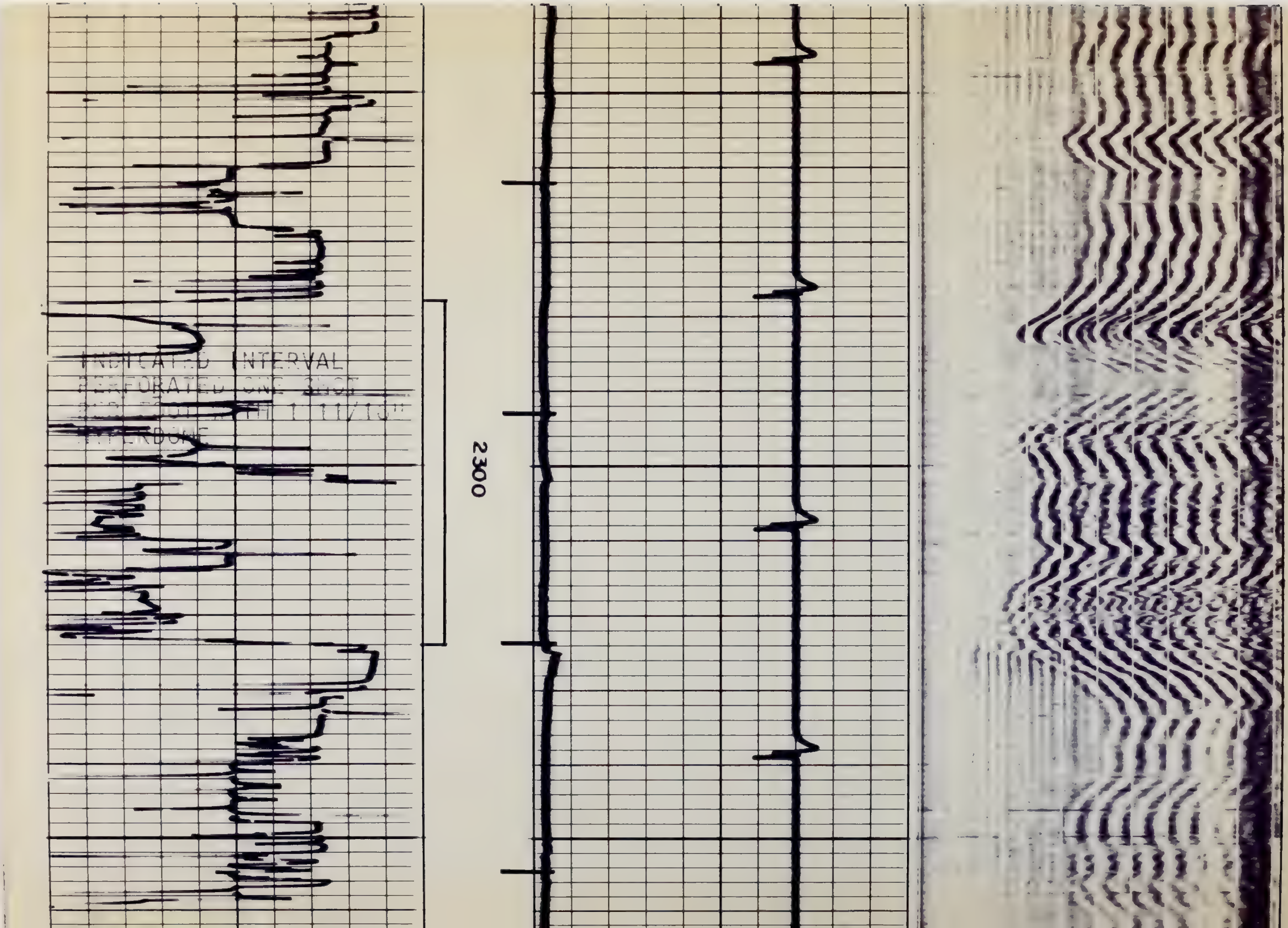

1700
DICATED INTERVAL
PERFORATED ON

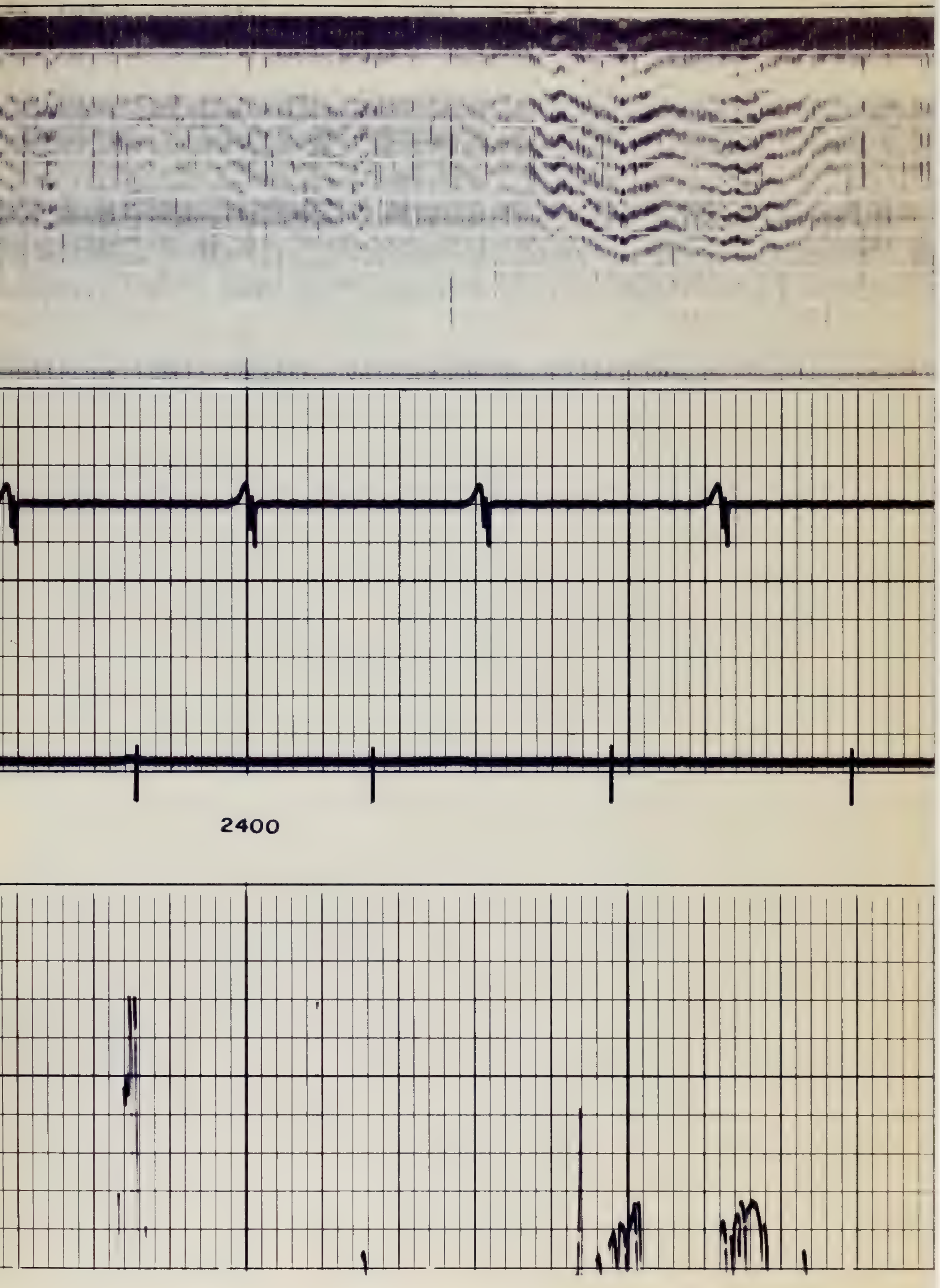

1800
DOME

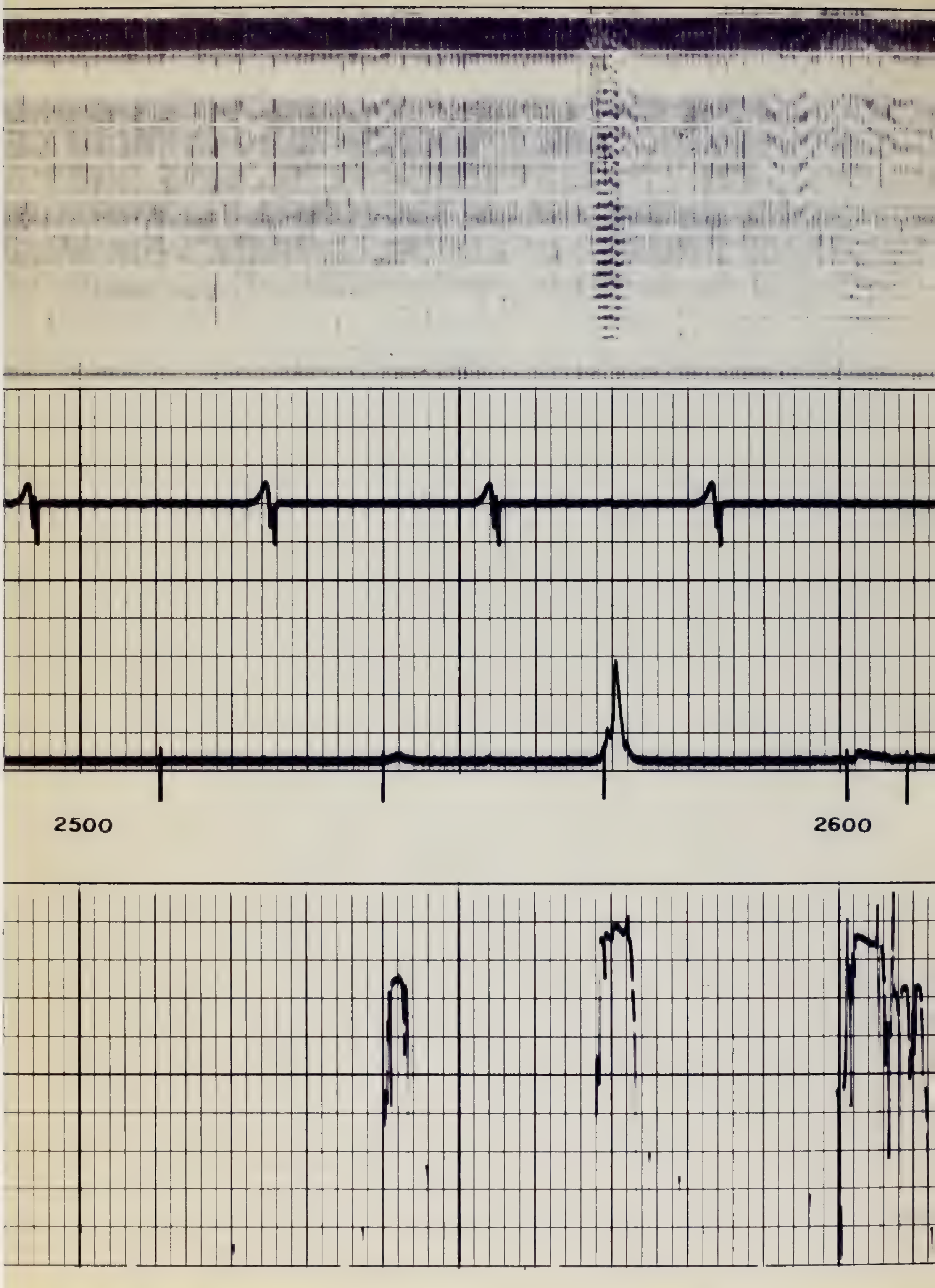

1900
LOCATED INTERVAL
PERFORATED ONE SHOT PER

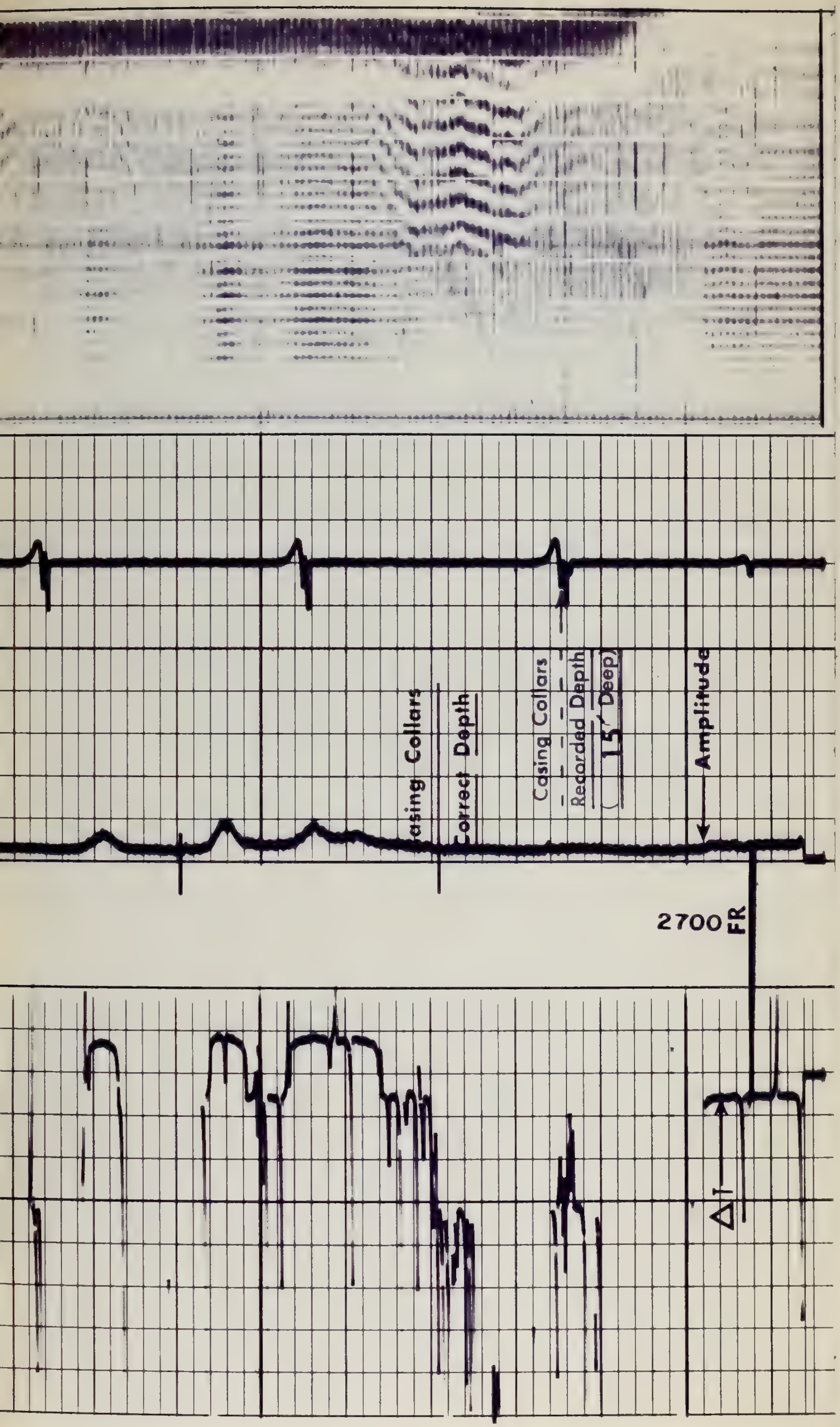

2000
2100

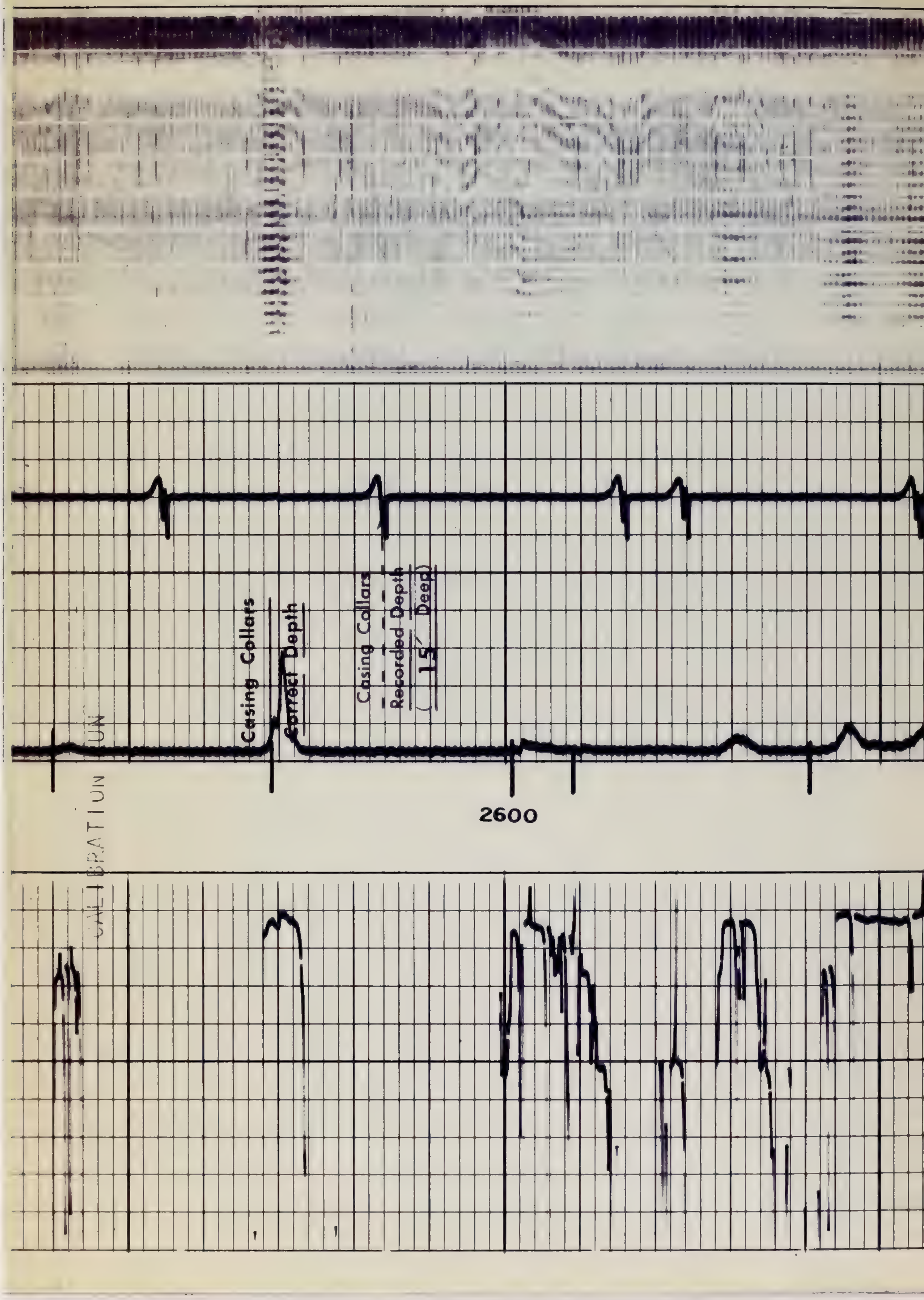

2200
DICATED LATERAL
RFORATED
PER FOOT

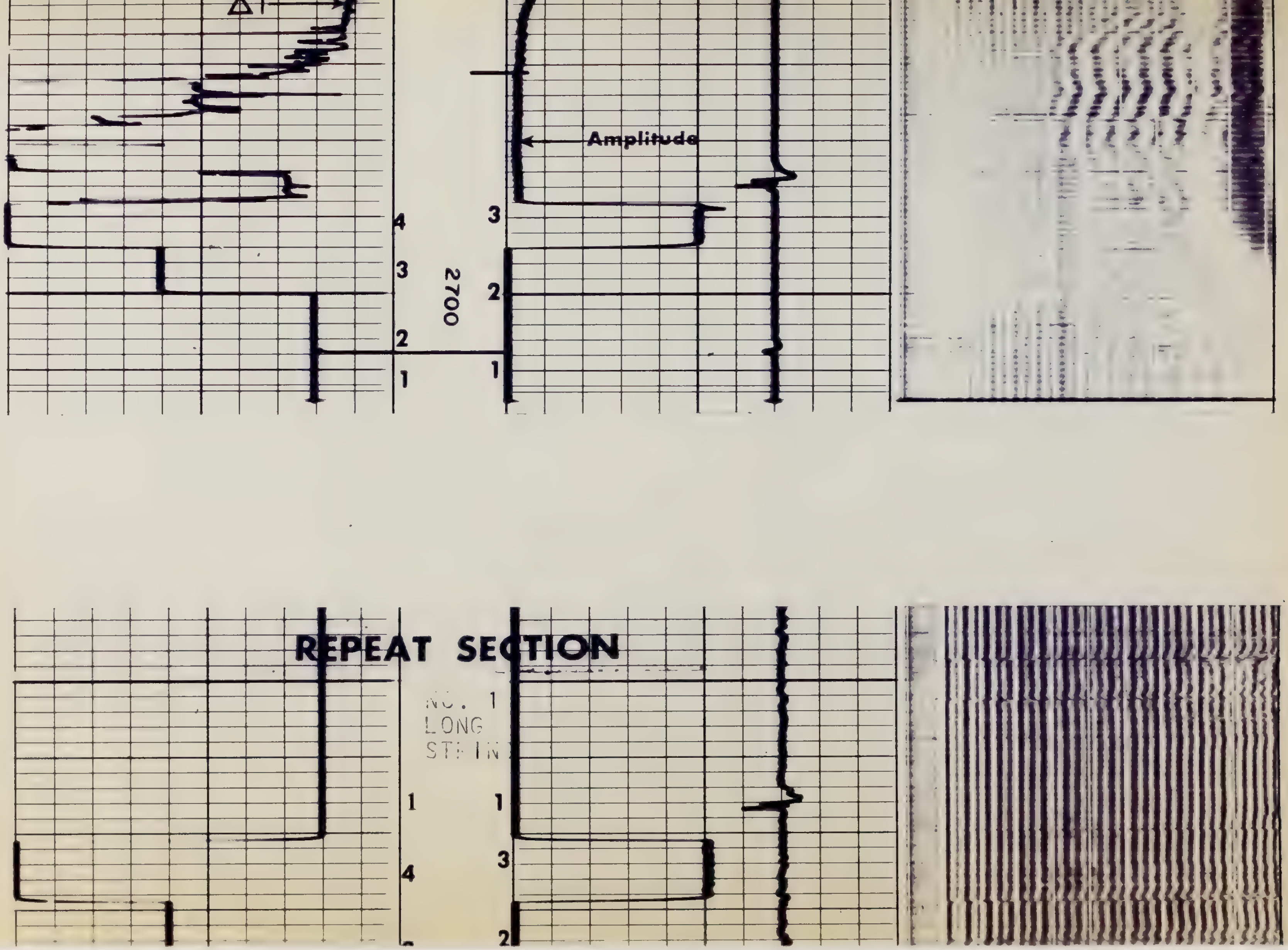
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH 1 11/16"
HYPERDOME
2300


2400

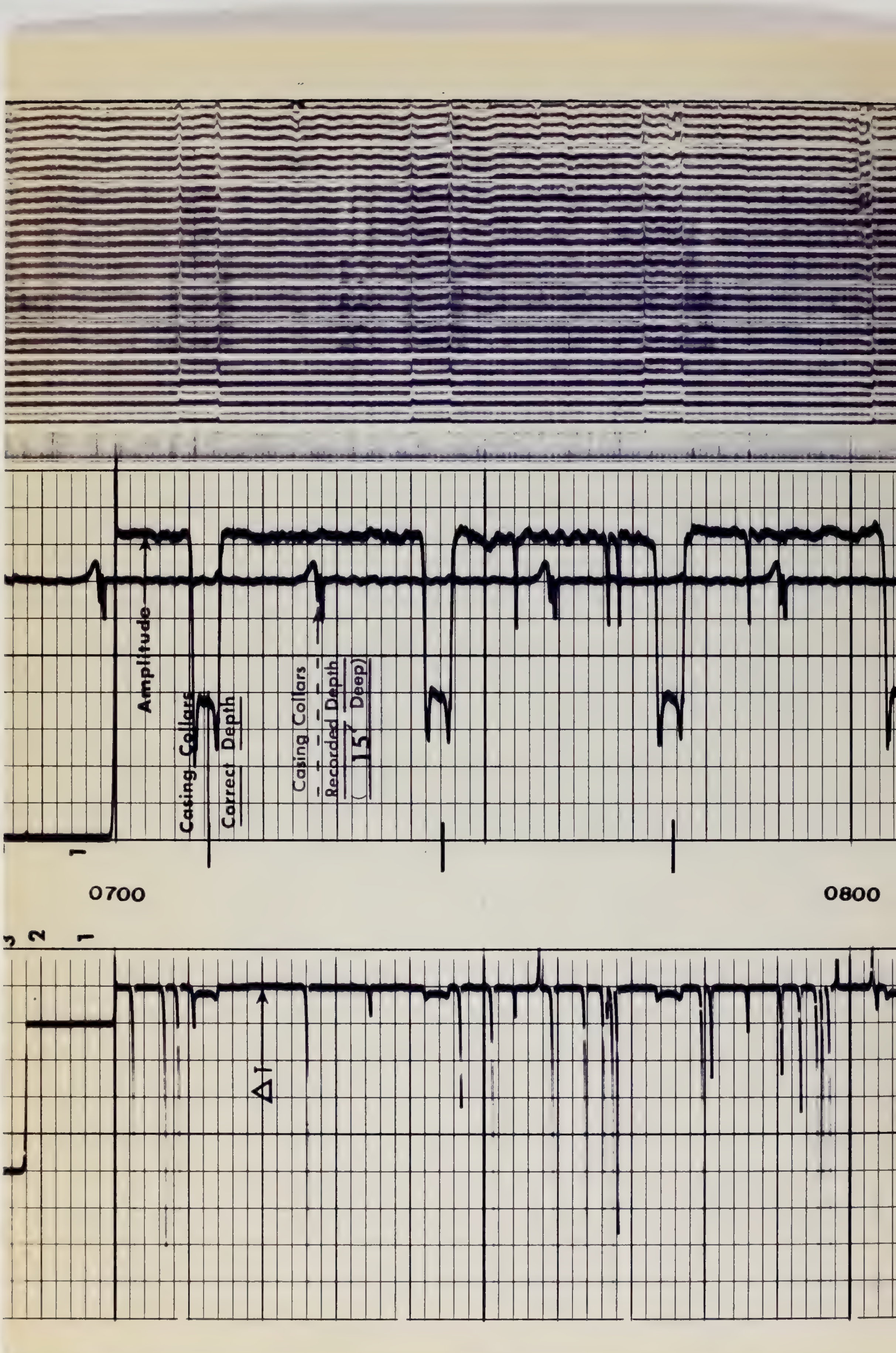

2500
2600

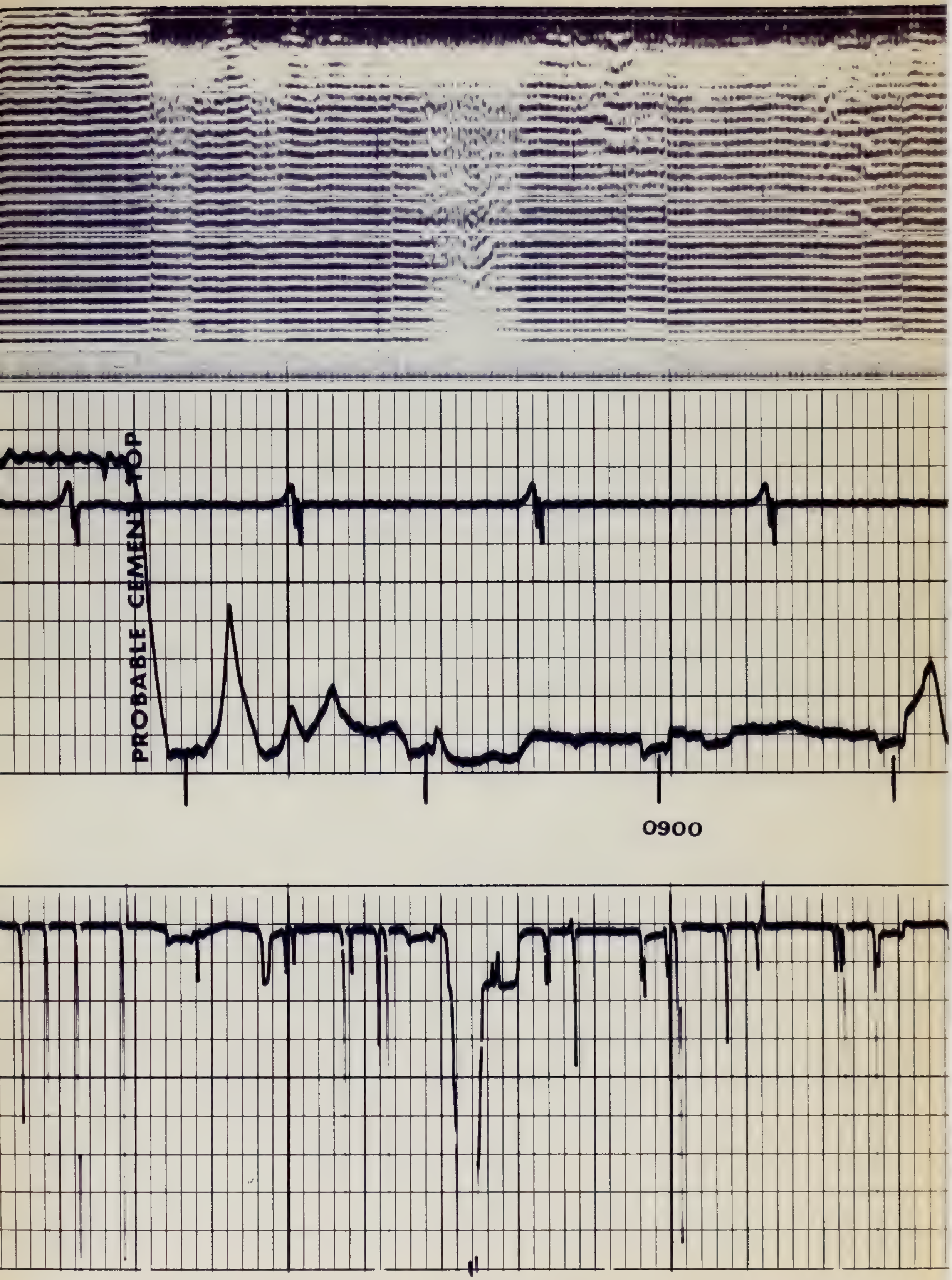

asing Collars
orrect Depth
Casing Collars
Recorded Depth
(15' Deep)
Amplitude
2700
FR
ΔT

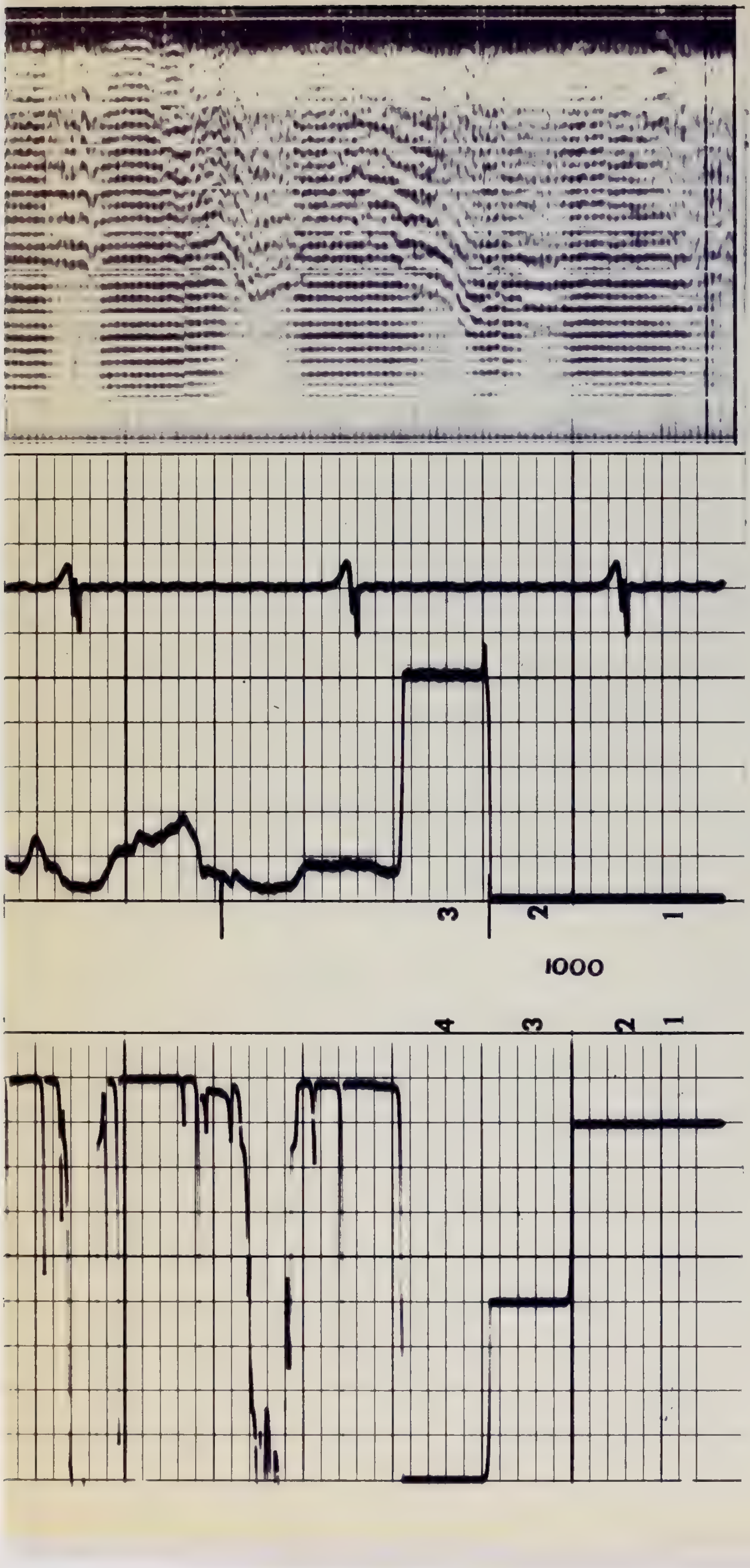

CALIBRATION
Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(15' Deep)
2600

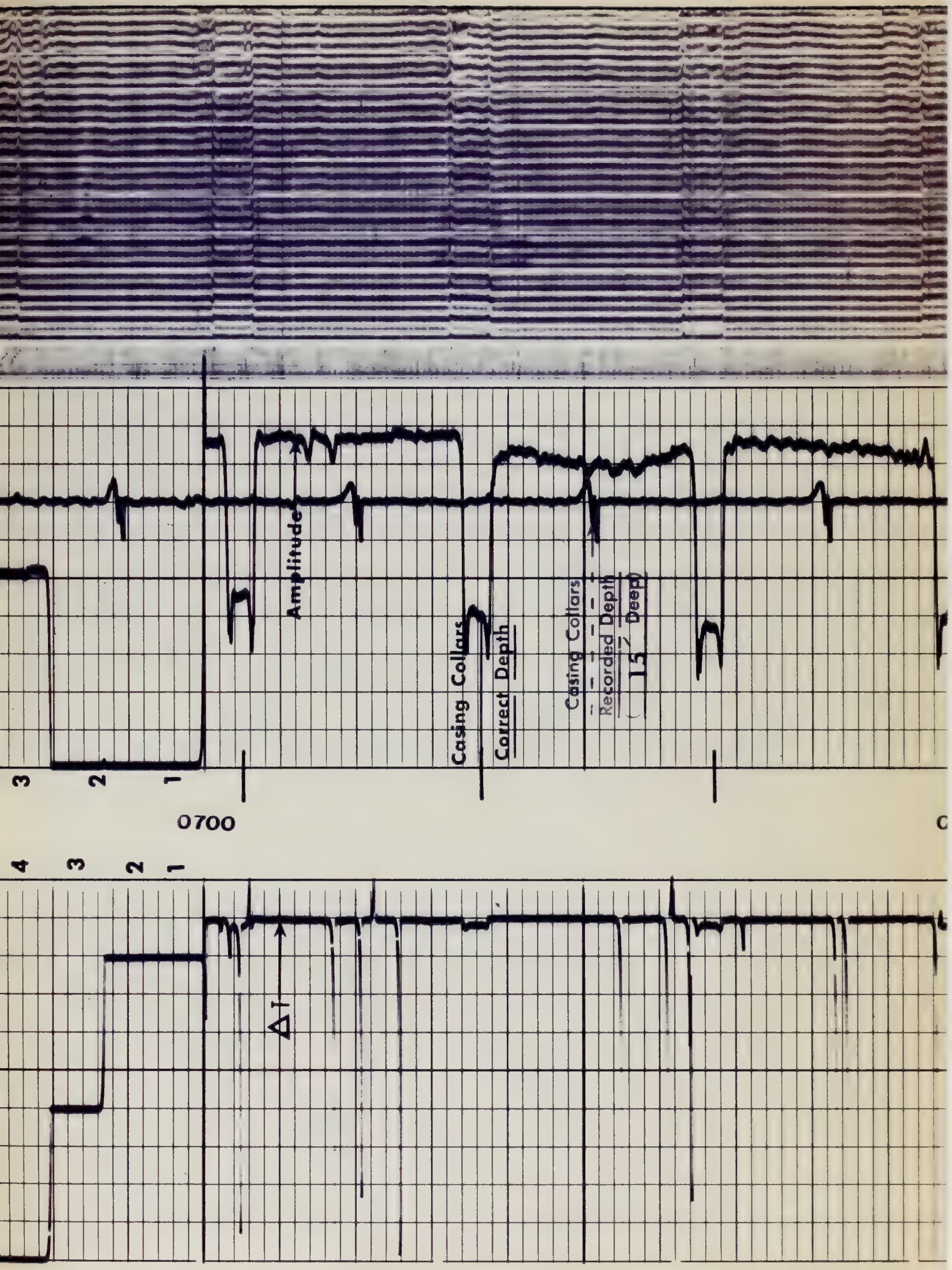


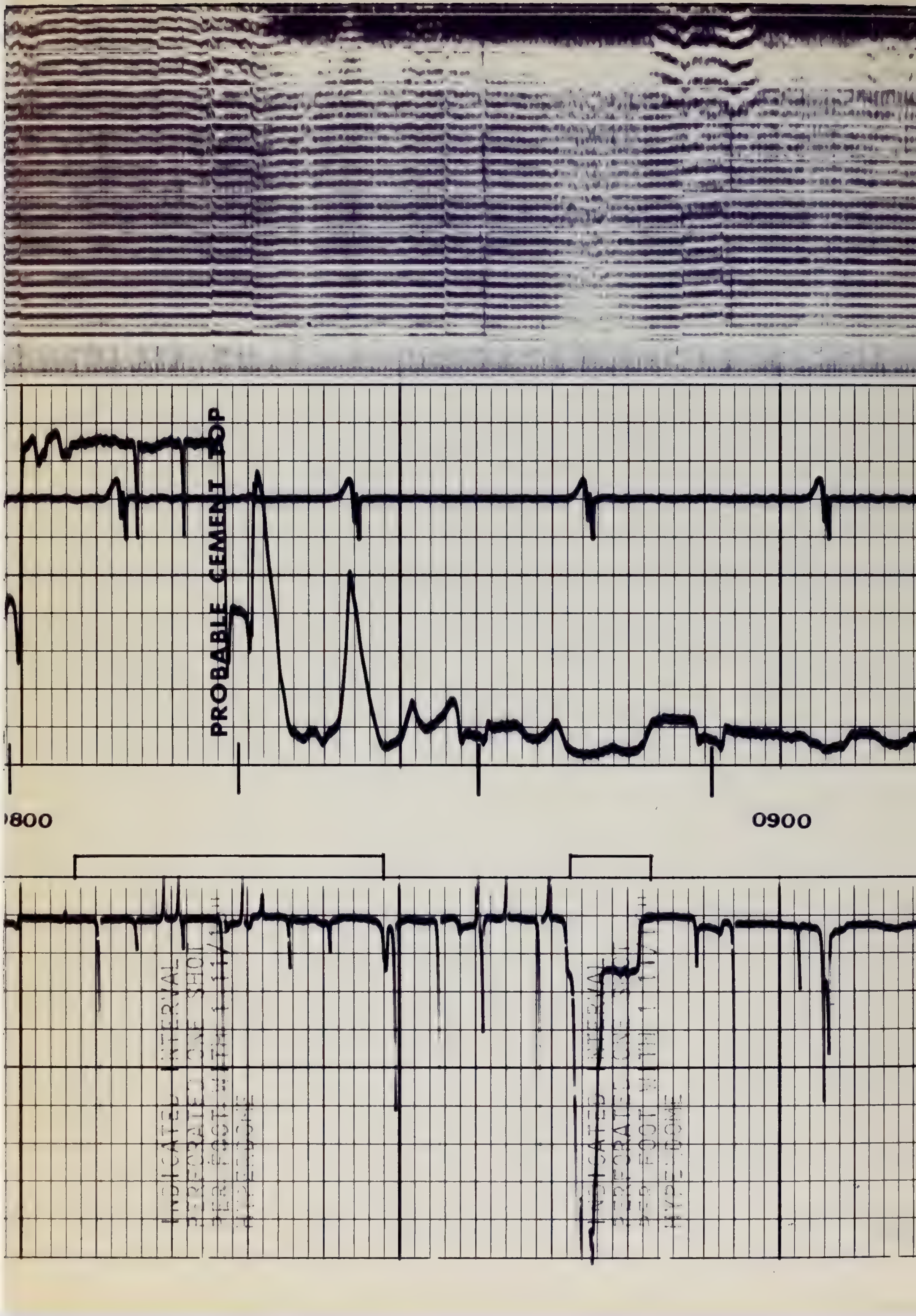
Amplitude
4
3
2
1
3
2
1
2700
REPEAT SECTION
NO. 1
LONG
STEIN
1
1
4
3
2

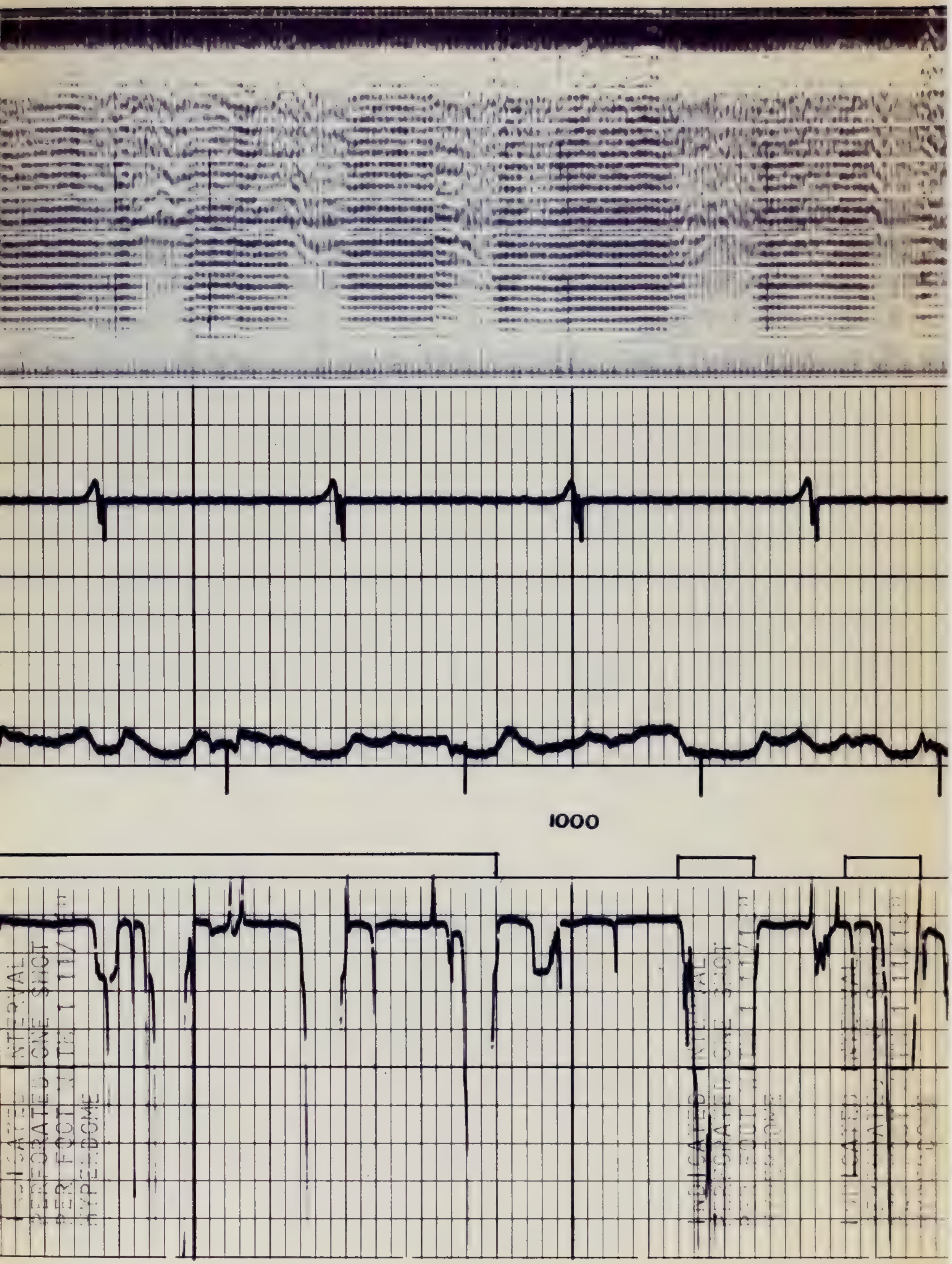

Amplitude
Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(15' Deep)
1
0700
0800
3
2
1
ΔT

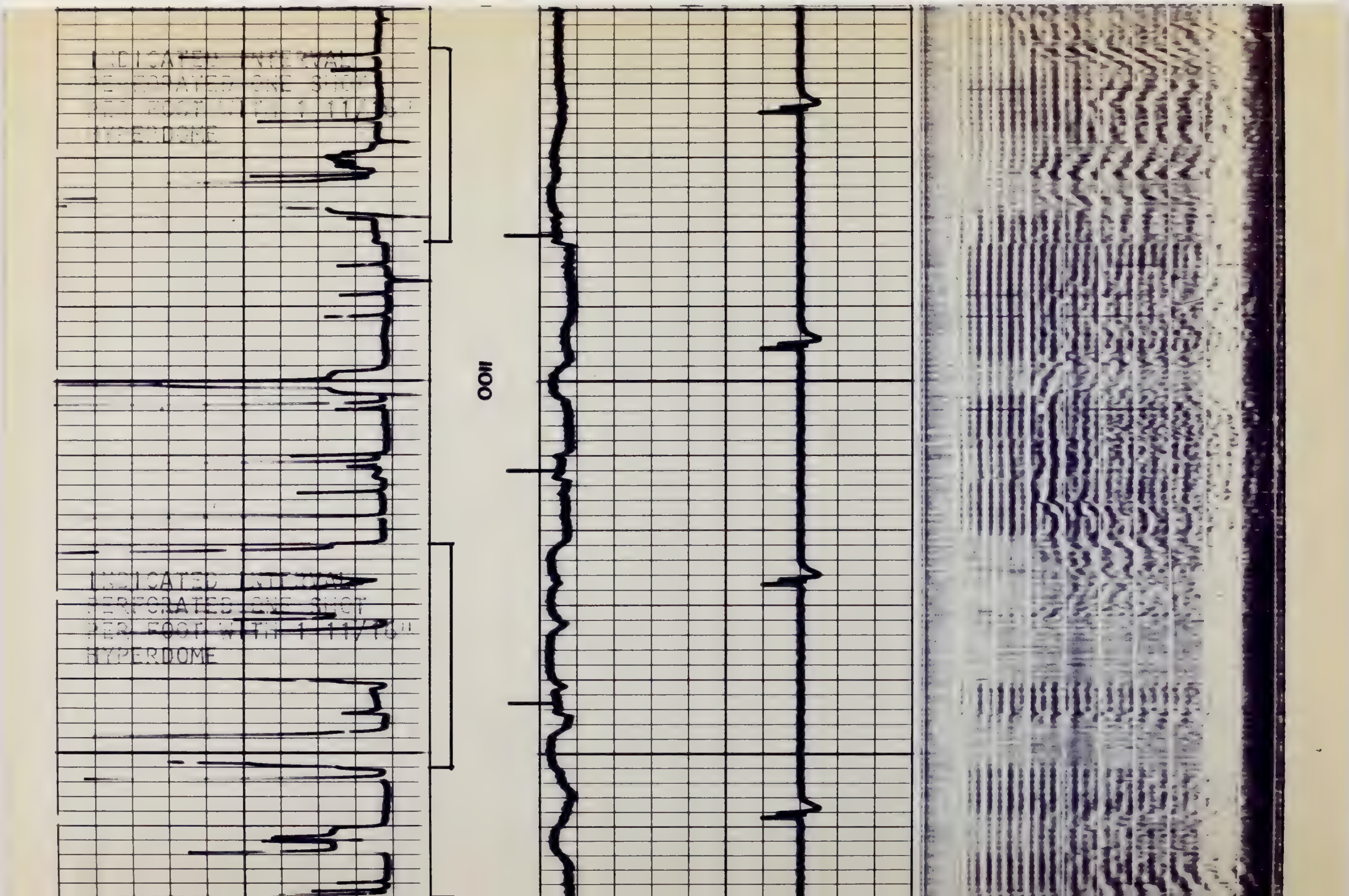

PROBABLE CEMENT TOP
0900

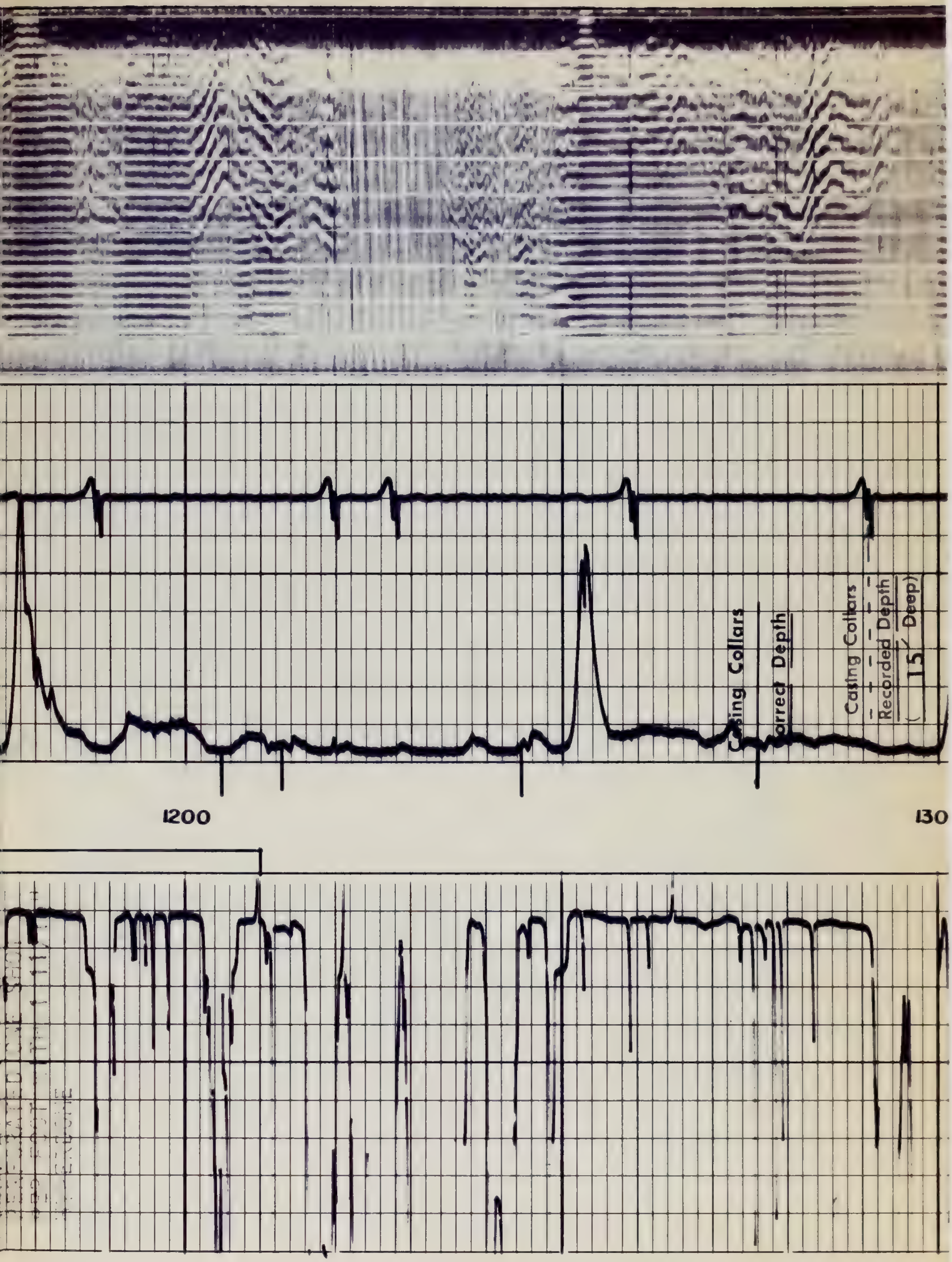

3
2
1
1000
4
3
2
1

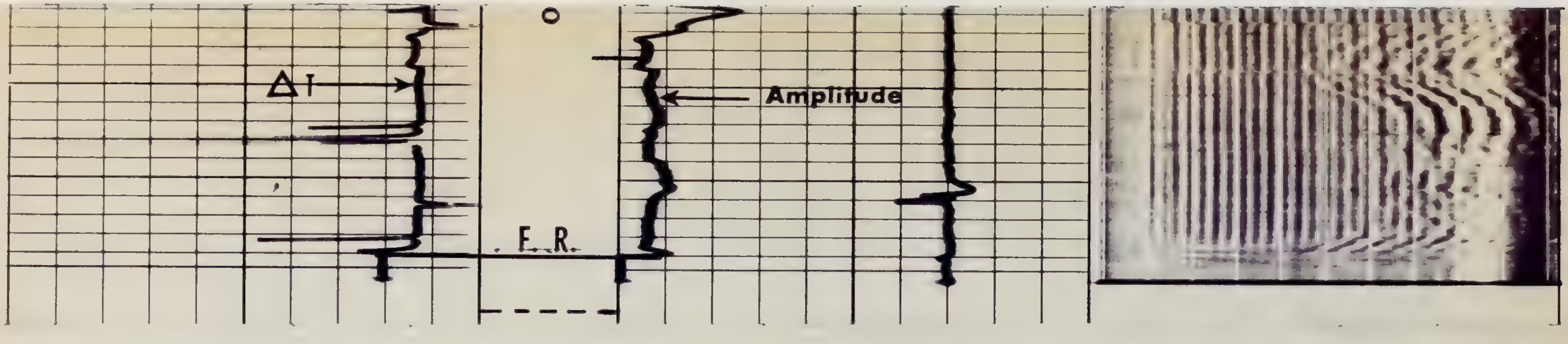

Amplitude
Casing Collars
Correct Depth
Casing Collars
Recorded Depth
15' Deep
ΔT
0700
3
2
1
4
3
2
1

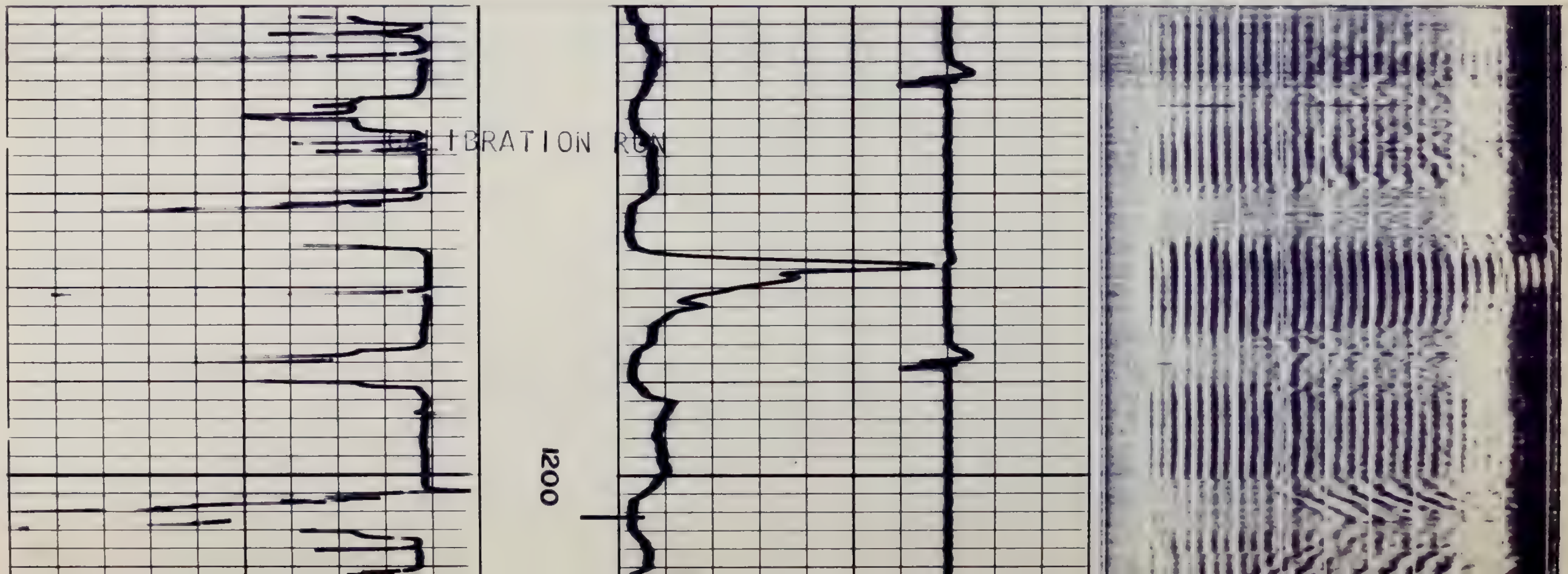

PROBABLE CEMENT TOP
800
0900
INDICATED INTERVAL PERFORATED ONE SHOT PER FOOT WITH 1 11/16 HYPERDOME
INDICATED INTERVAL PERFORATED ONE SHOT PER FOOT WITH 1 11/16 HYPERDOME

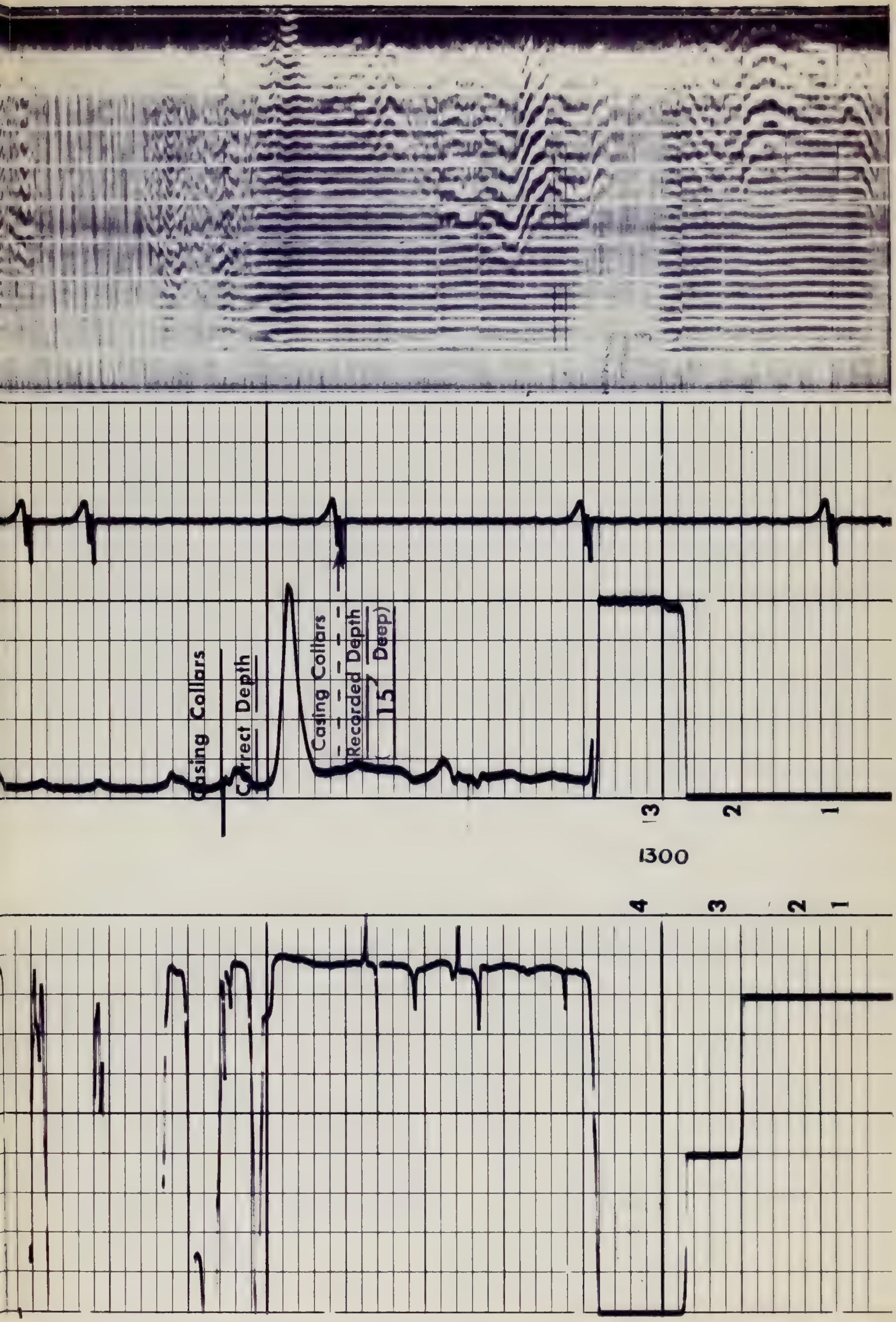

1000

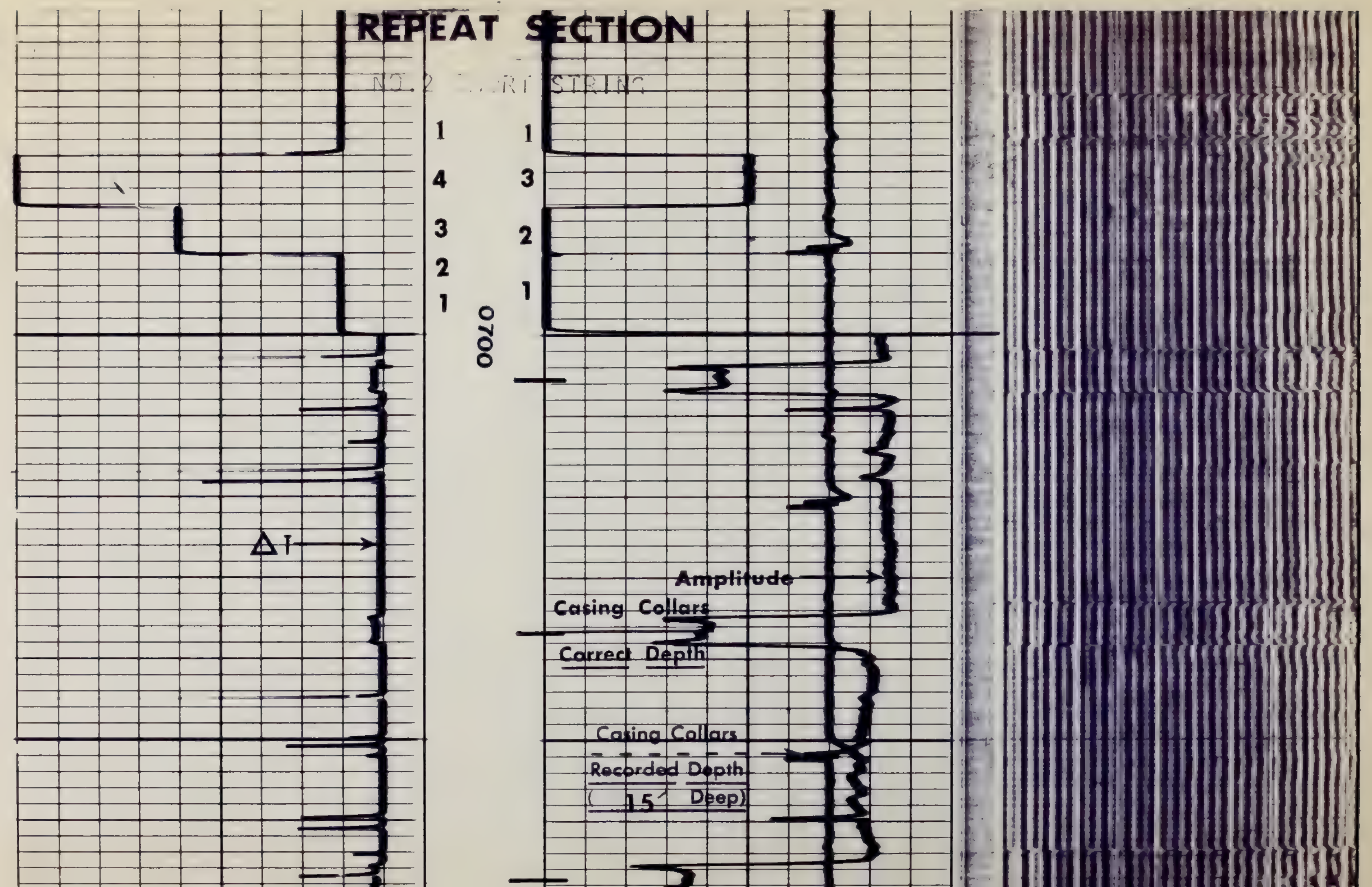

INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH 1 11/16"
HYPERDOME
1100
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH 1 11/16"
HYPERDOME

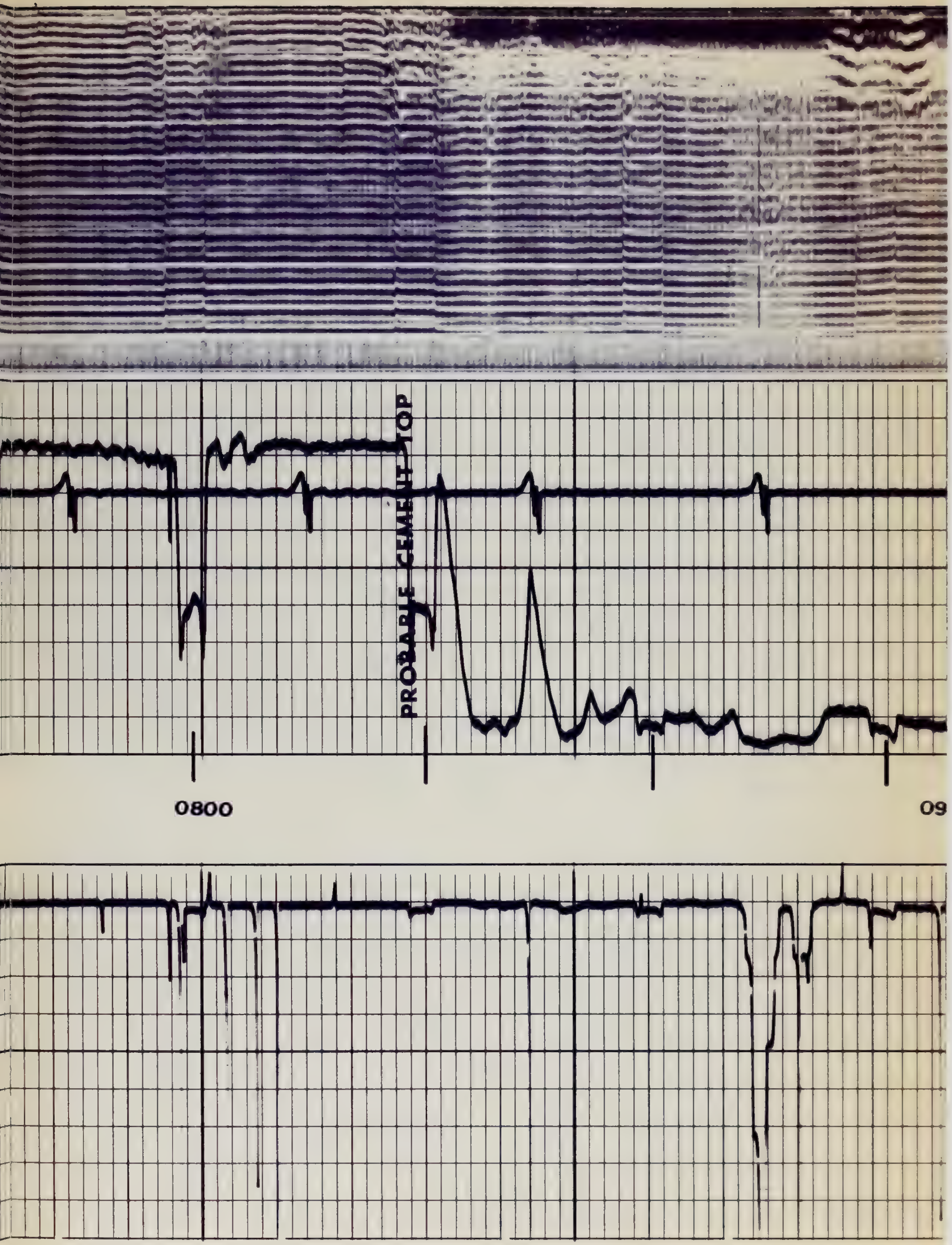

Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(15' Deep)
1200
130

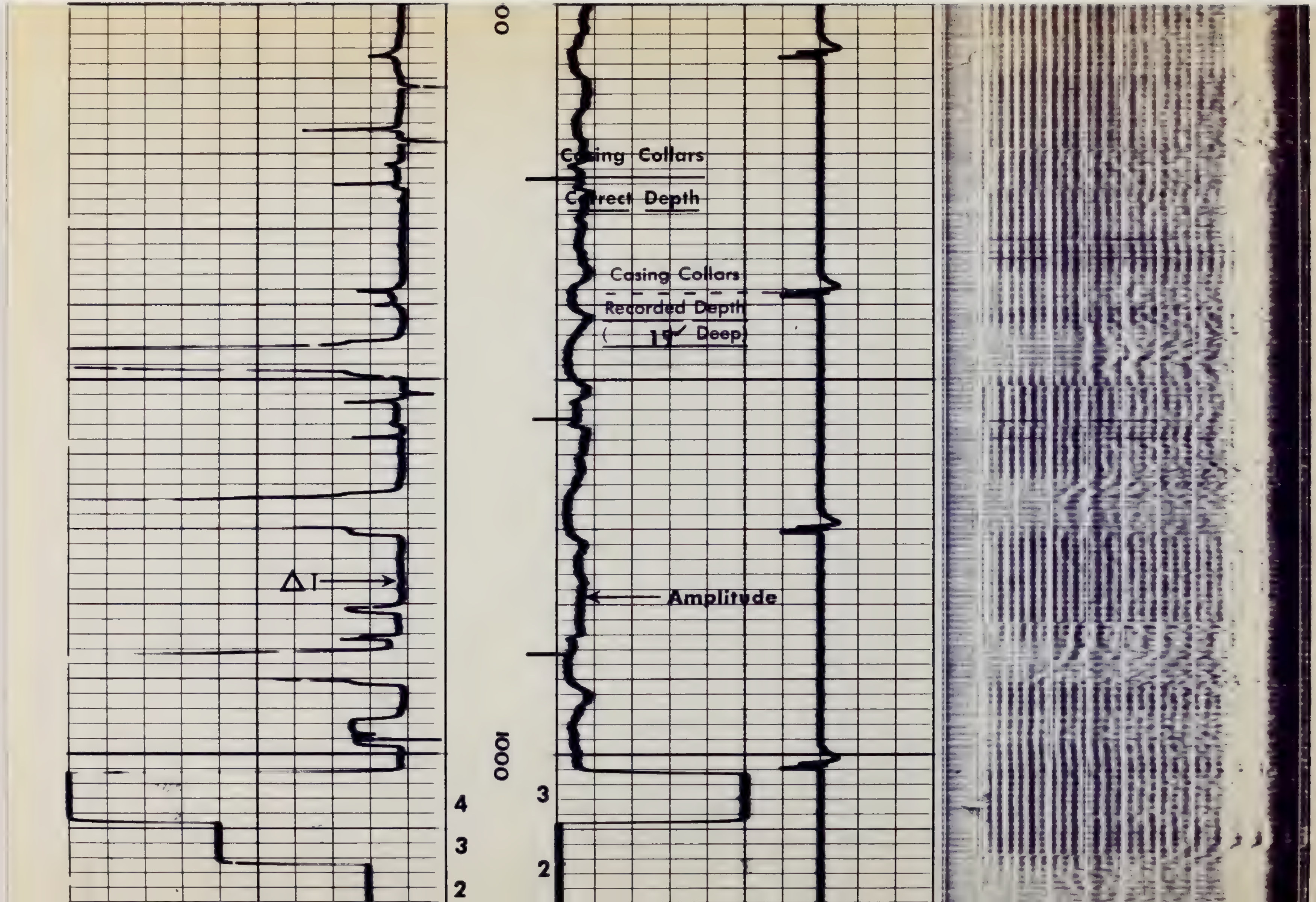

ΔT
0
F.R.
Amplitude


CALIBRATION RUN
1200


Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(15' Deep)
3
2
1
1300
4
3
2
1


REPEAT SECTION
NO. 2 SHORT STRING
1
4
3
2
1
1
3
2
1
0700
ΔT
Amplitude
Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(15′ Deep)


PROBABLE CEMENT TOP
0800
09


Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(15' Deep)
Amplitude
ΔI
00
1000
4
3
2
3
2

Casing Collars
Corrected Depth

TRANSIT TIME
MICROSECONDS ______ SPACING
400 200

DEPTH

CASING BOND
MILLIVOLTS
0 100

VARIABLE DENSITY
MICROSECONDS ______ SPACING
200 1200

COMPANY ATLANTIC RICHFIELD COMPANY
WELL S.G. NO. 9
FIELD SORGHUM GULCH
COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 2712
SCHL. TD 2720
DRLR TD ----
Elev:
KB ----
DF ----
GL 6870

CEMENT BOND CALIBRATION CODING

	Δt	AMPLITUDE
1.	MECHANICAL ZERO	MECHANICAL ZERO
2.	240 μ sec	ELECTRICAL ZERO
3.	320 μ sec	CALIBRATE
4.	400 μ sec	

Schlumberger

CEMENT BOND LOG

GR-CCL-VDL

COUNTY RIO BLANCO
Field or LOCATION SORGHUM GULCH
WELL S.G. NO.11
COMPANY ATLANTIC RICHFIELD COMPANY

COMPANY ATLANTIC RICHFIELD COMPANY

WELL S.G.NO.11

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

LOCATION 12' NSL & 160'WEL
API Serial No.
Sec. 7 Twp. 3S Rge. 96W

Other Services:

Permanent Datum: GROUND LEVEL, Elev. 6900
Log Measured From GL, 0 Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B. ----
D.F. ----
G.L. 6900

Date	9-24-74	Type Drill Fluid	WATER
Run No.	ONE	Fluid Level	FULL
Depth — Driller	2814	Max. Rec. Temp.	---- °F
Depth — Logger	2812	Est. Cement Top	1110
Btm. Log Interval	2804	Equip. | Location	3862 | VERNAL
Top Log Interval	950	Recorded By	ST. AUBYN
Open Hole Size	7 7/8	Witnessed By	MR. ELLARD

CASING REC.	Size	Wt/Ft	Grade	Type Joint	Top	Bottom
Surface String	8 5/8					
Prot. String (1)	2 3/8	4.7		T & C	0	2820
Prod. String (2)	2 3/8	4.7		T & C	0	1511
Liner STRING (3)	2 3/8	4.7		T & C	0	1323

PRIMARY CEMENTING DATA

STRING	Surface	Protection	Production	Liner
Vol. of cement			235 SKS	
Type of cement			HOWCO LT. WT.	
Additive			10#/SK GILSONITE	
			.3% LWL	
Retarder				
Wt. of slurry				
Water loss				
Type fluid in csg.				
Fluid wt.				

FOLD HERE The well name, location and borehole reference data were furnished by the customer.

PRIMARY CEMENTING PROCEDURE

	Hour — date	Hours from start of operation
Started pumping cement		
Release pressure	13:00 9-14-74	
Start Cement Bond Log	16:00 9-24-74	
Finish Cement Bond Log	22:00 9-24-74	

REMARKS

Service Order No. 49326

Csg. Collars Recorded 19 ft. DEEP

Preceding fluid________Volume________bbls.

Cement pumped________bbls./minute

Pipe reciprocated during Pumping: Yes______No______

Pipe reciprocated after plug down: Yes______min., No______

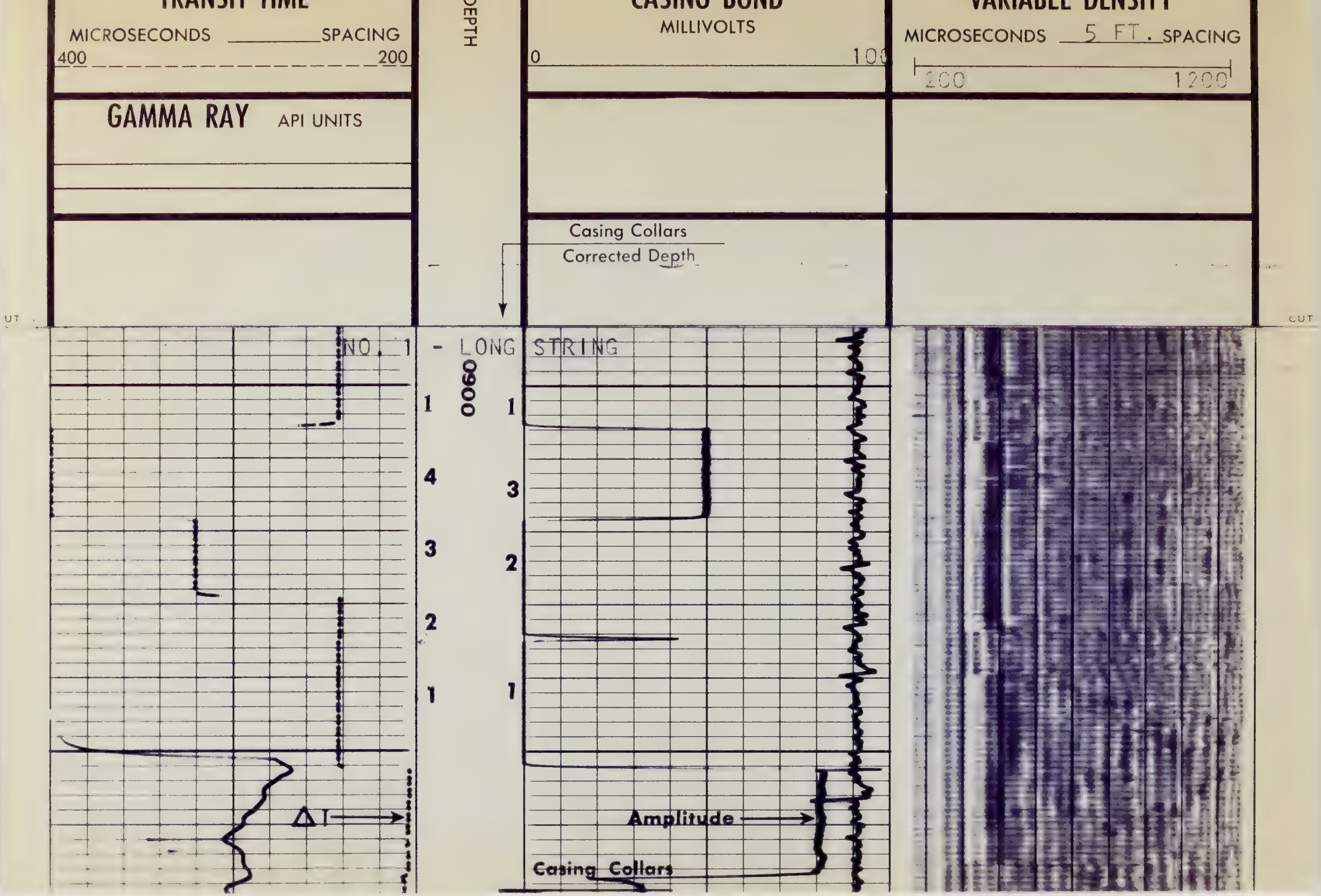
SQUEEZE JOB DETAIL

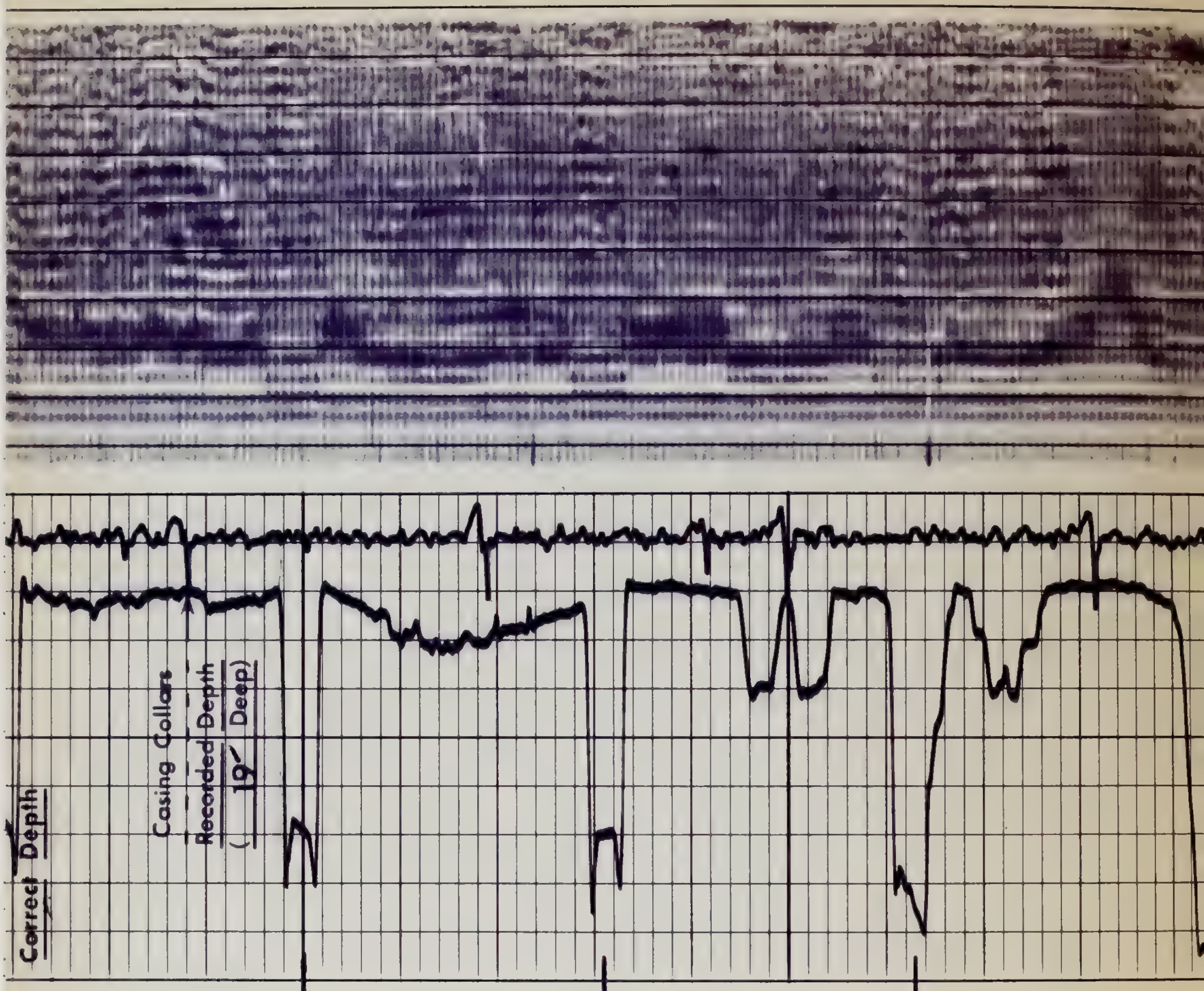
Squeeze number	1	2
Date		
Depth interval		
Type cement		
Volume of cement		
Additive		
Retarder		
Weight of slurry		
Preceding fluid		
Breakdown pressure		
Max. pressure-stage 1		
" " " 2		
" " " 3		
Final maximum pressure		
Started pumping cement		
Released pressure		
Start CBL		
Finish CBL		

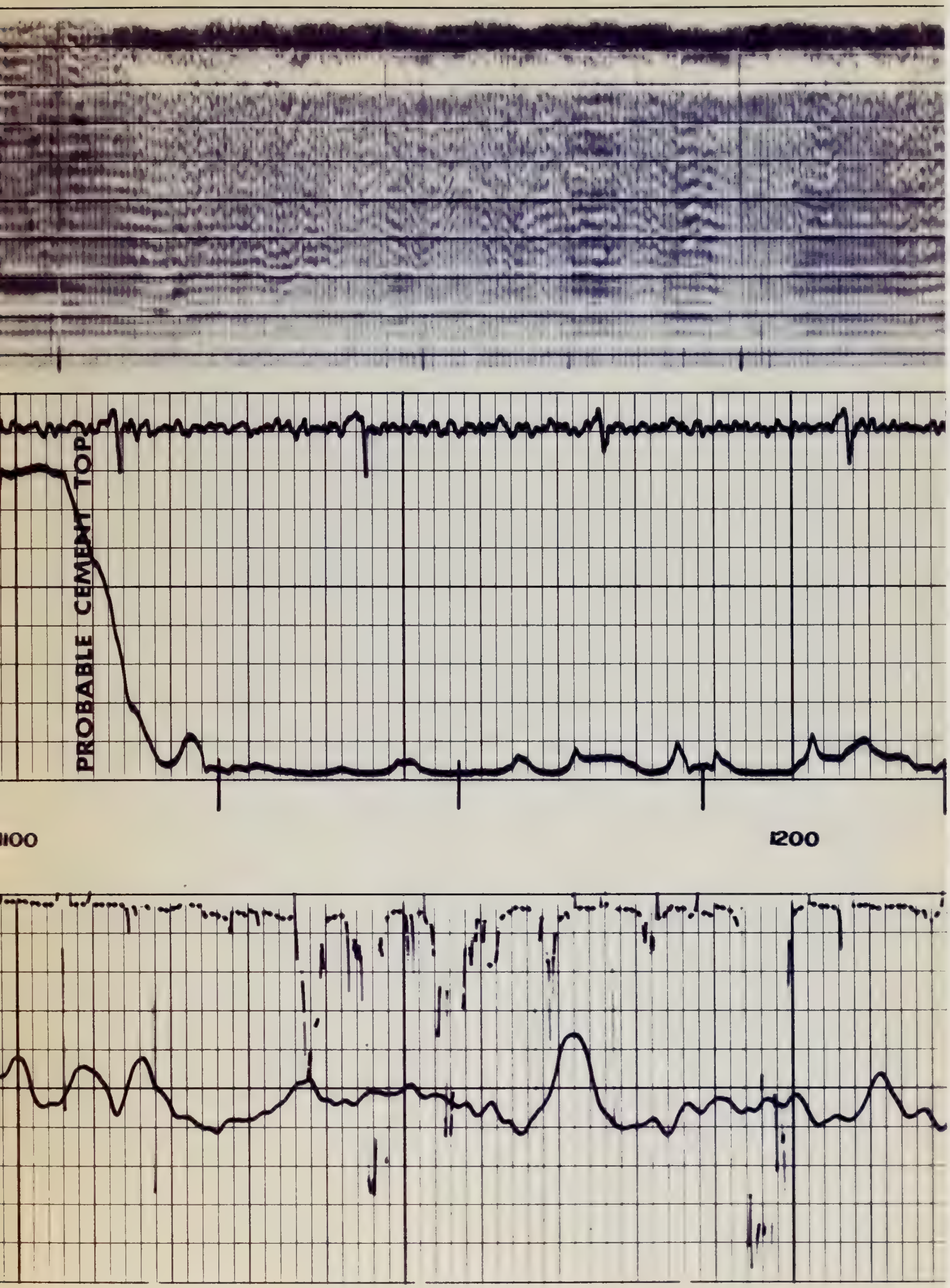
AVERAGE WELL DRIFT:

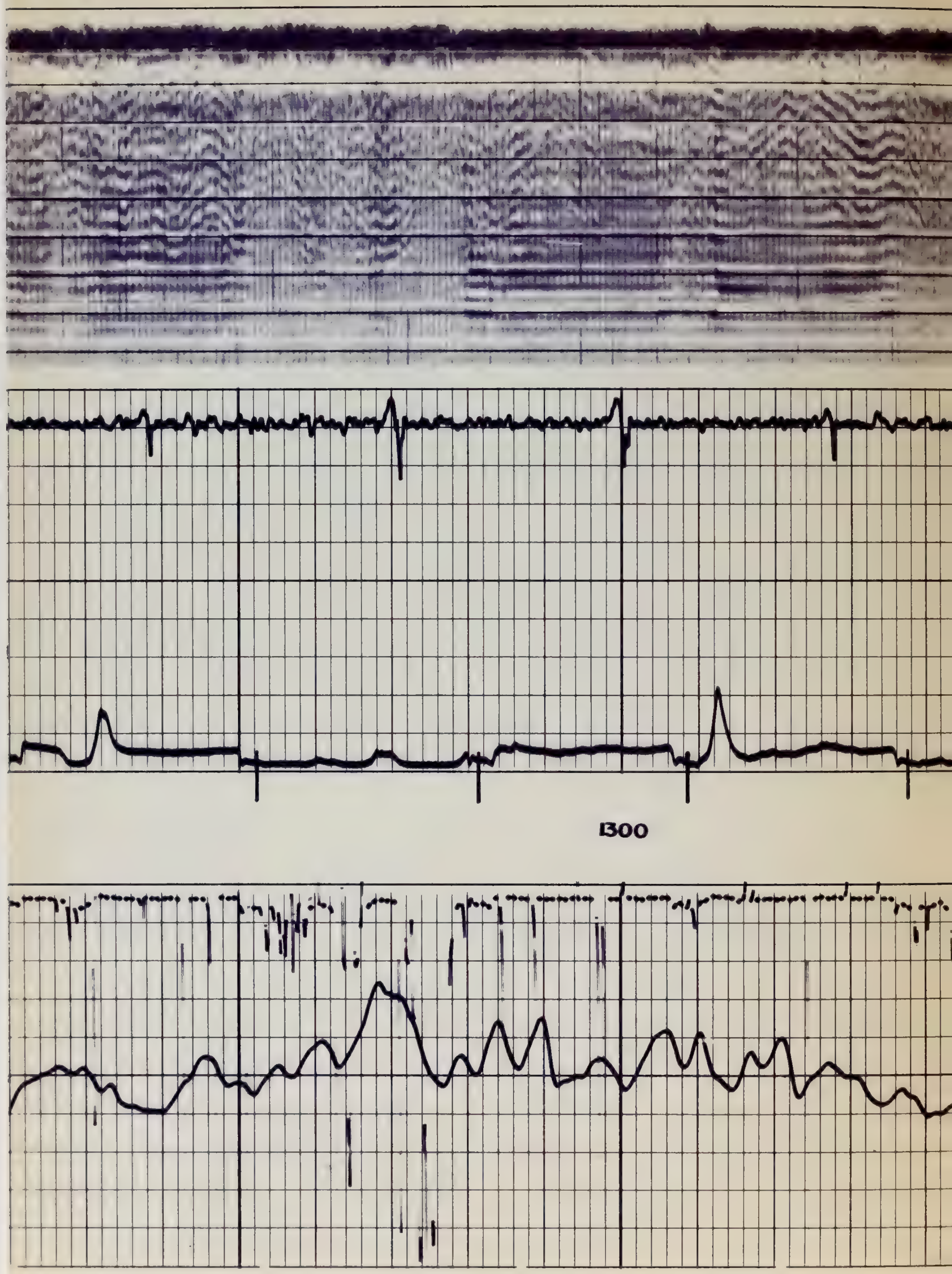
° from to ; ° from to ; ° from to

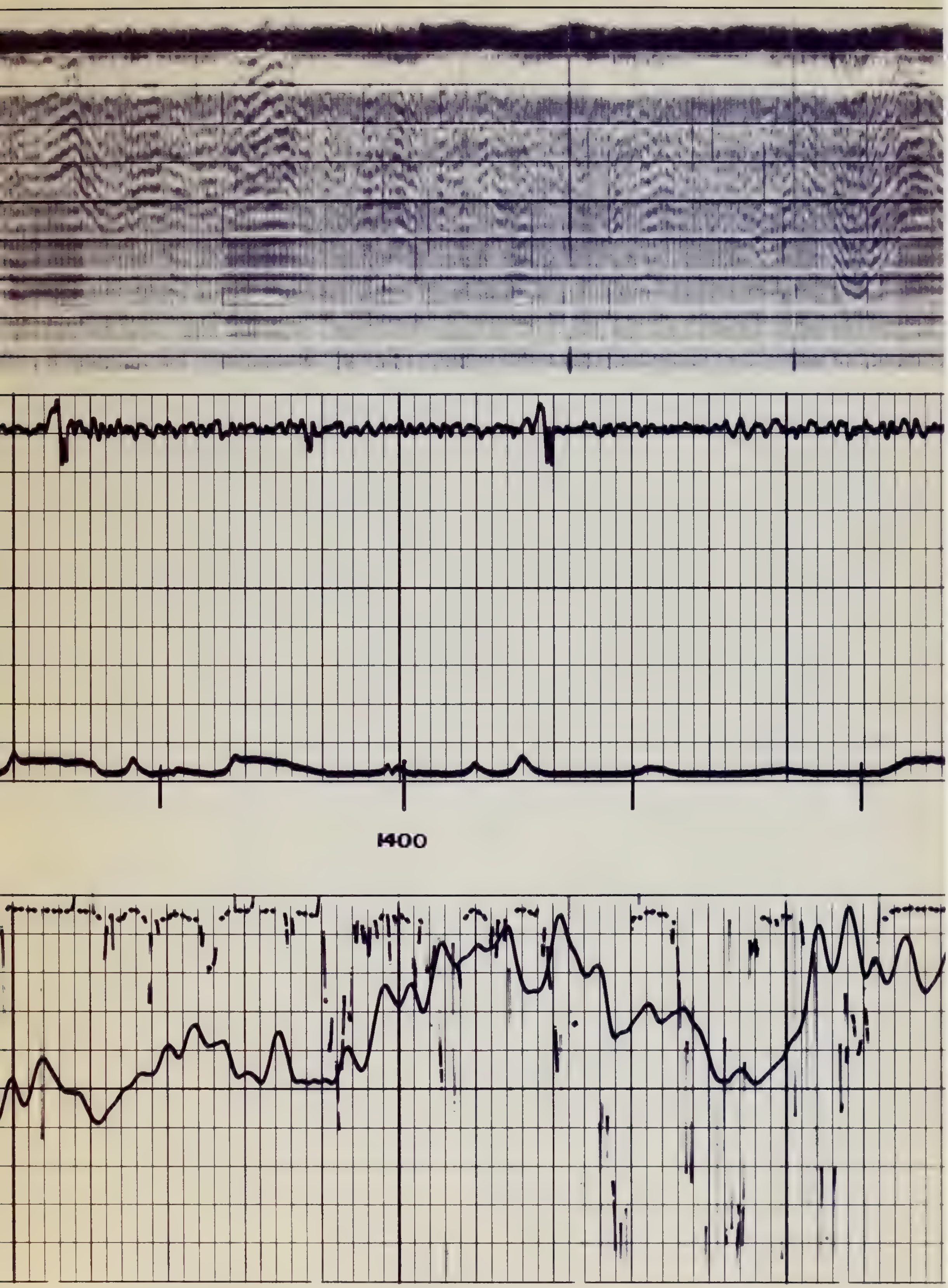
EQUIPMENT DATA	Centralizer Depths	Scratcher Depths
Sonic Panel No.	SLP-FH#639	
Sonic Cart No.	SHH-AHA#45	
Sonic Sonde No.	SLT-JC#54	
CRP No.	14	
Mem Panel No.	MMP-B#201	
GR Panel No.	GNP-D#556	
GR Cart No.	SHH-AFA#91	
Centralizer: Type	CME-V CAL-AJ	
No.	CMEW	
To Level (MV)	100	
Cart. Gain	1/20	
CRP Intensity	.16	
R9G Intensity	$7\frac{1}{2}$	
Logging Speed	30 FPM	
Time Constant		

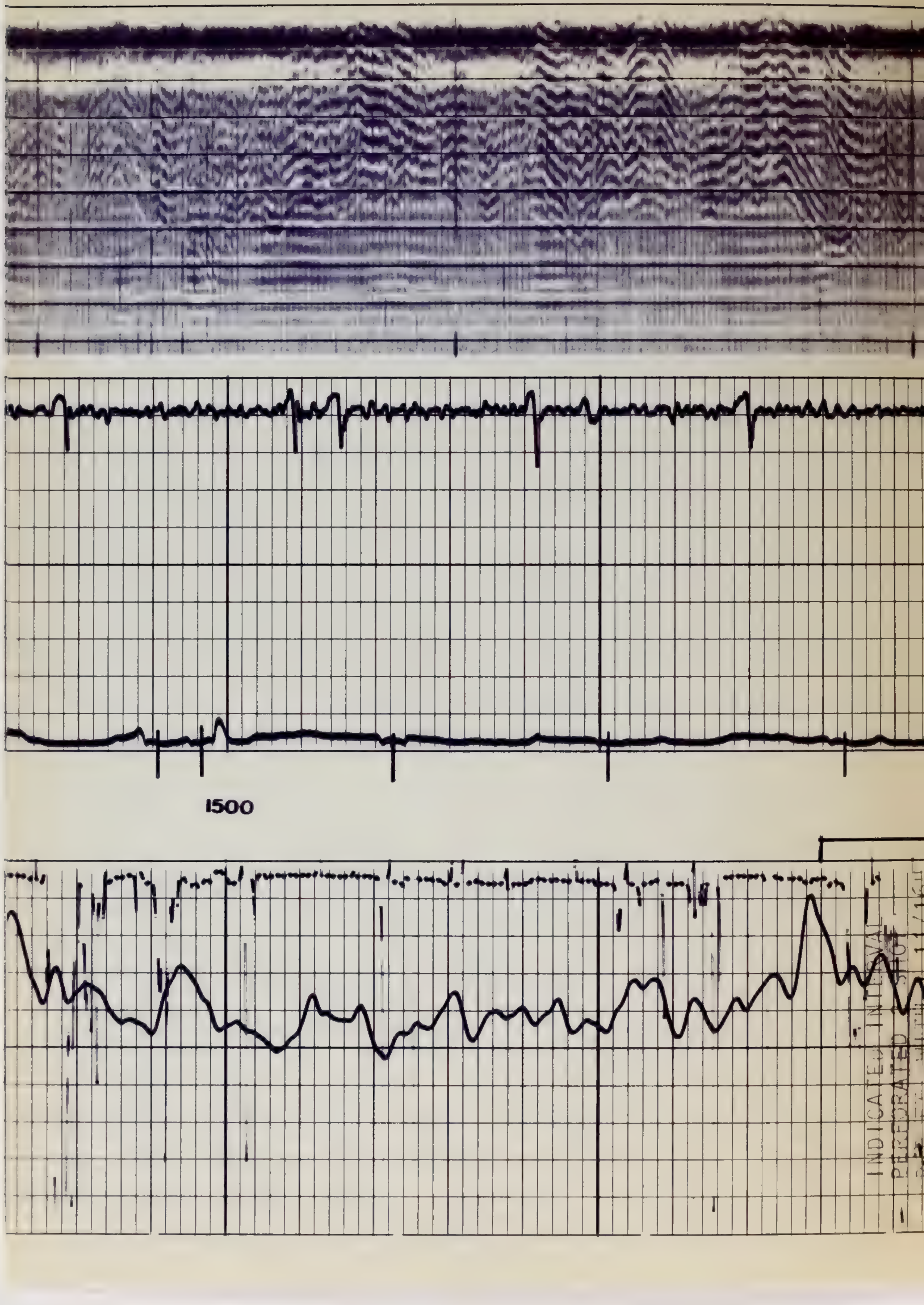

TRANSIT TIME
MICROSECONDS
SPACING
400
200
GAMMA RAY
API UNITS
DEPTH
CASING BOND
MILLIVOLTS
0
10
Casing Collars
Corrected Depth
VARIABLE DENSITY
MICROSECONDS
5 FT.
SPACING
200
1200
CUT
NO. 1 - LONG STRING
0900
1
4
3
2
1
1
3
2
1
ΔT
Amplitude
Casing Collars

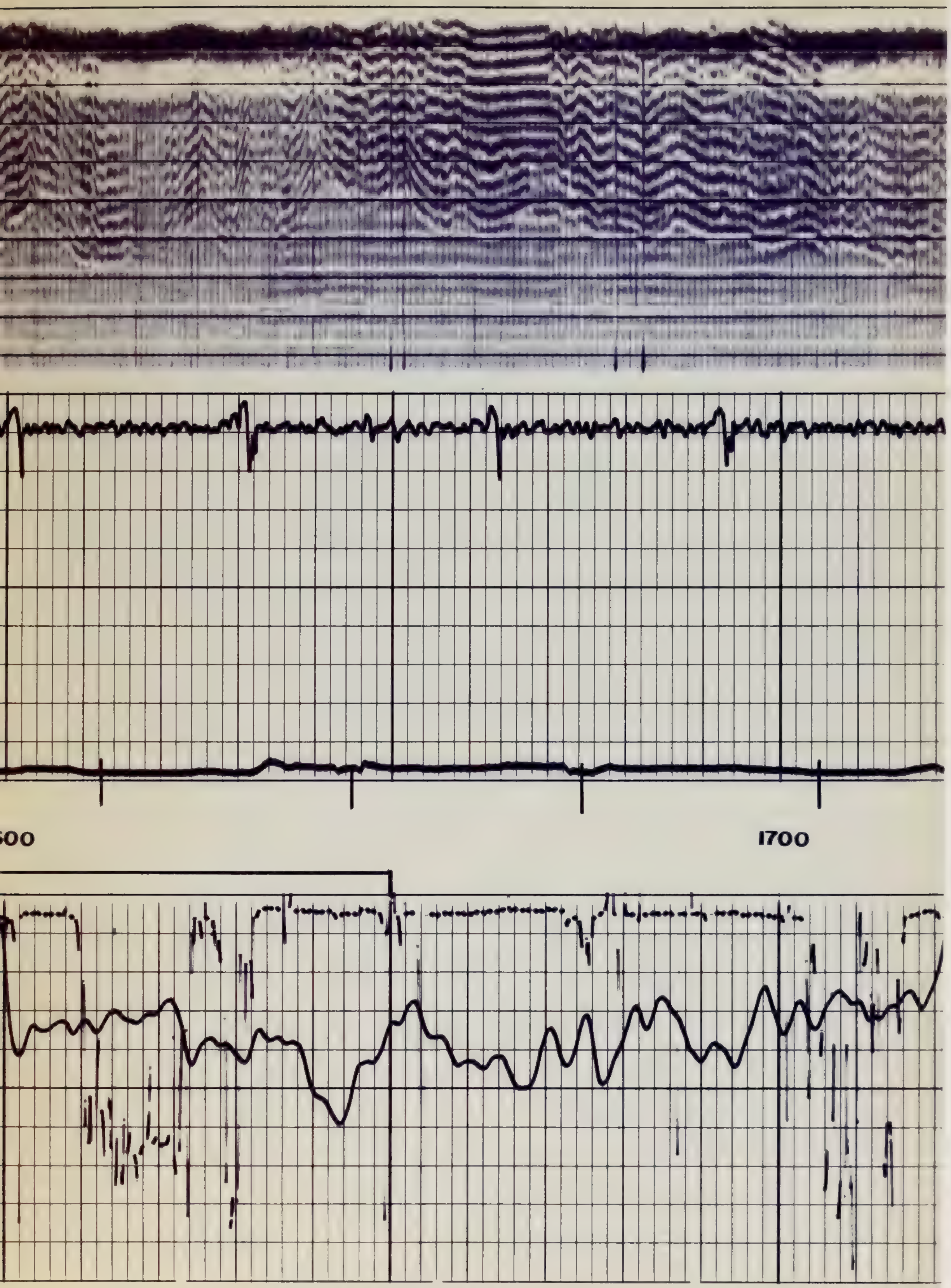

Correct Depth
Casing Collars
Recorded Depth
(19' Deep)
1000
GR

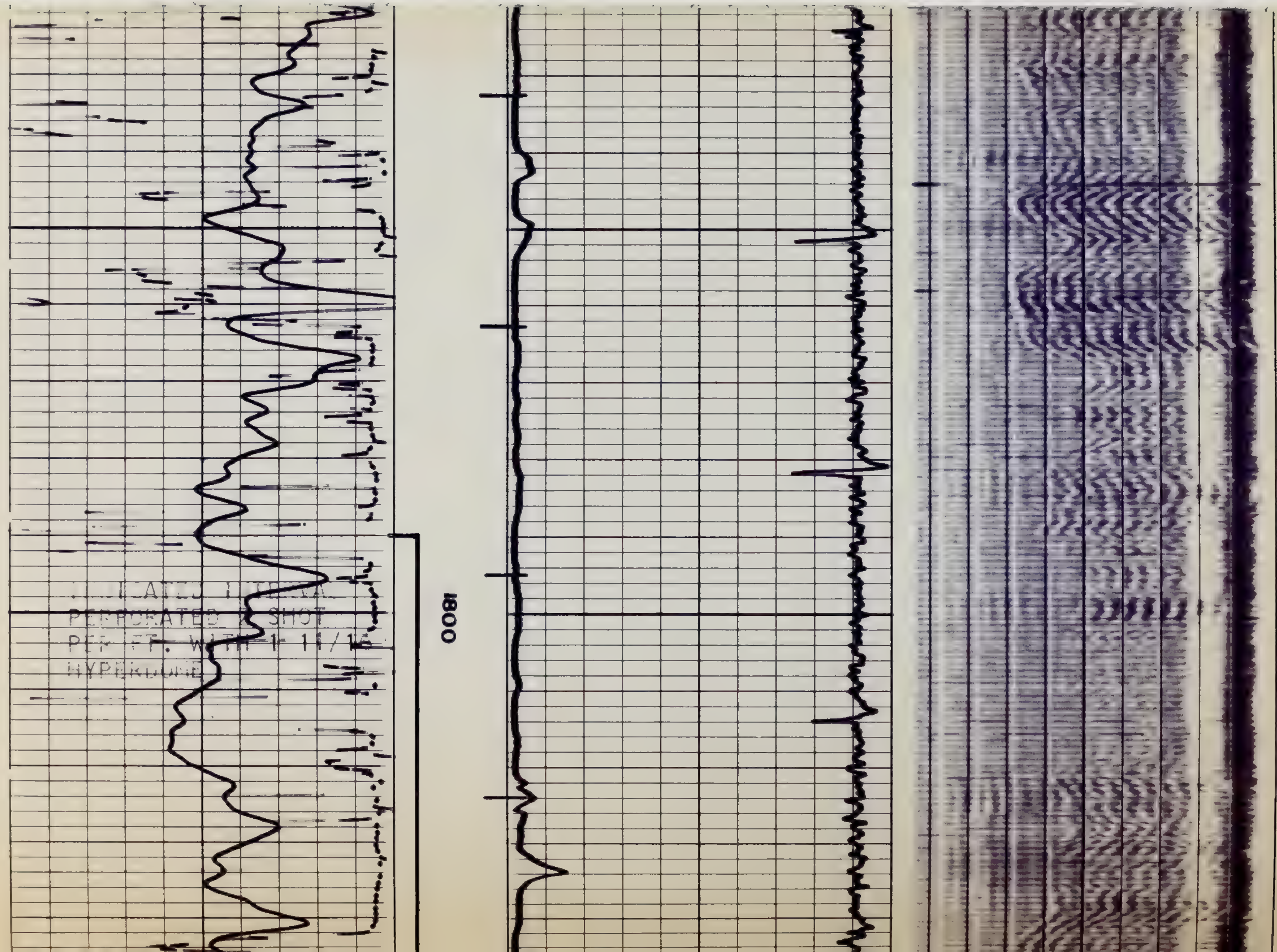

PROBABLE CEMENT TOP
1100
1200

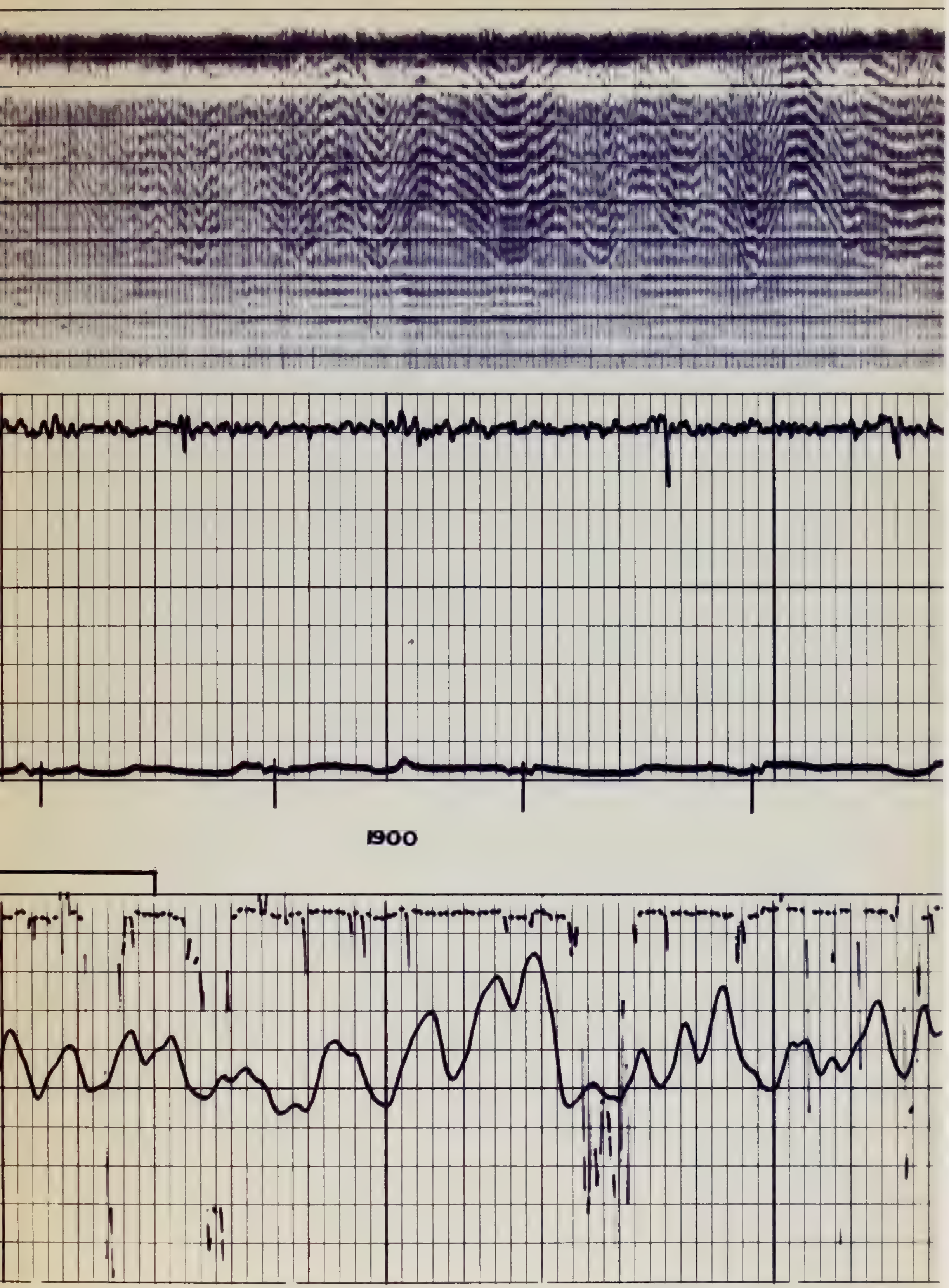

1300

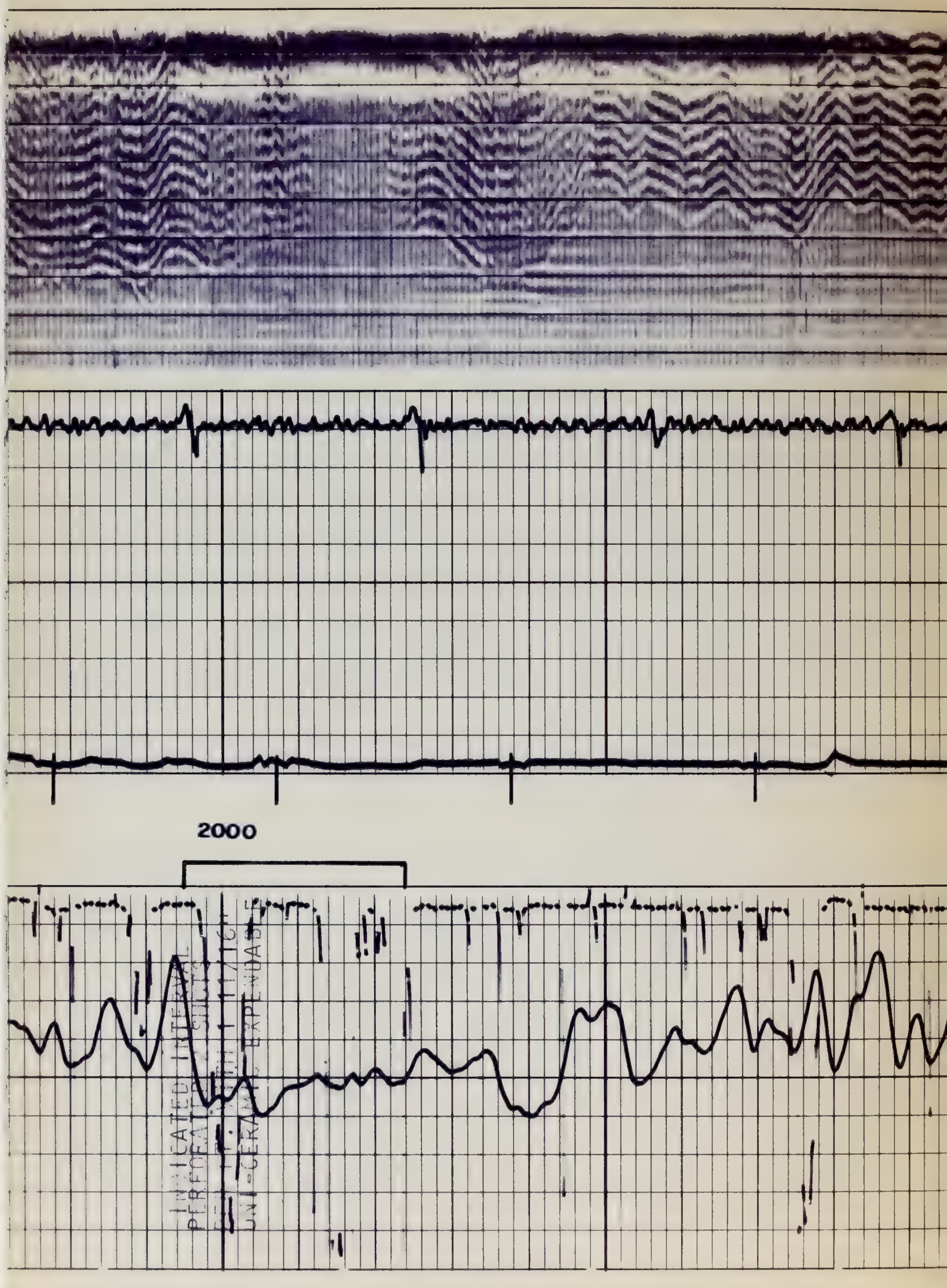

1400

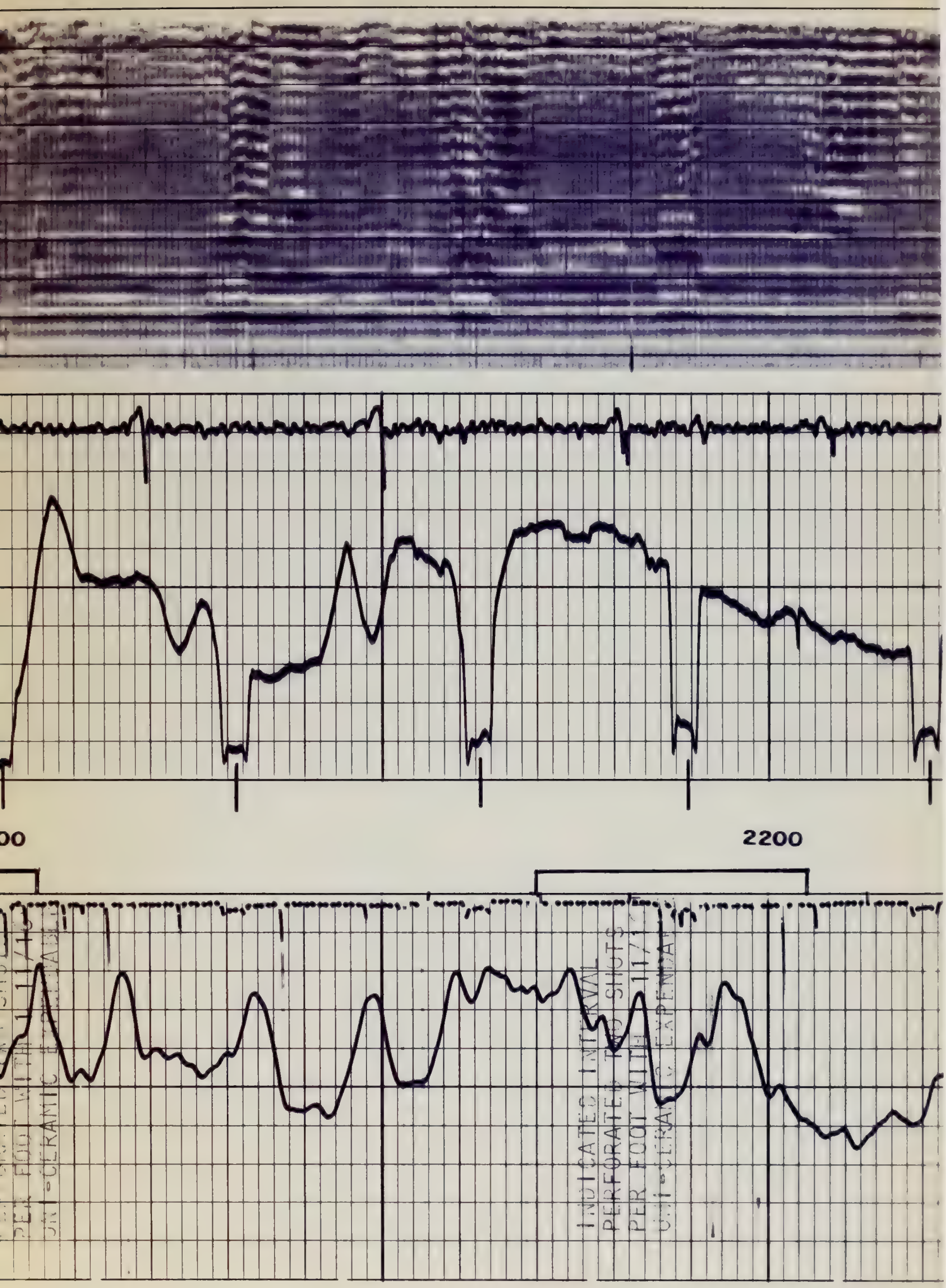

1500
INDICATED INTERVAL
PERFORATED
SHOT

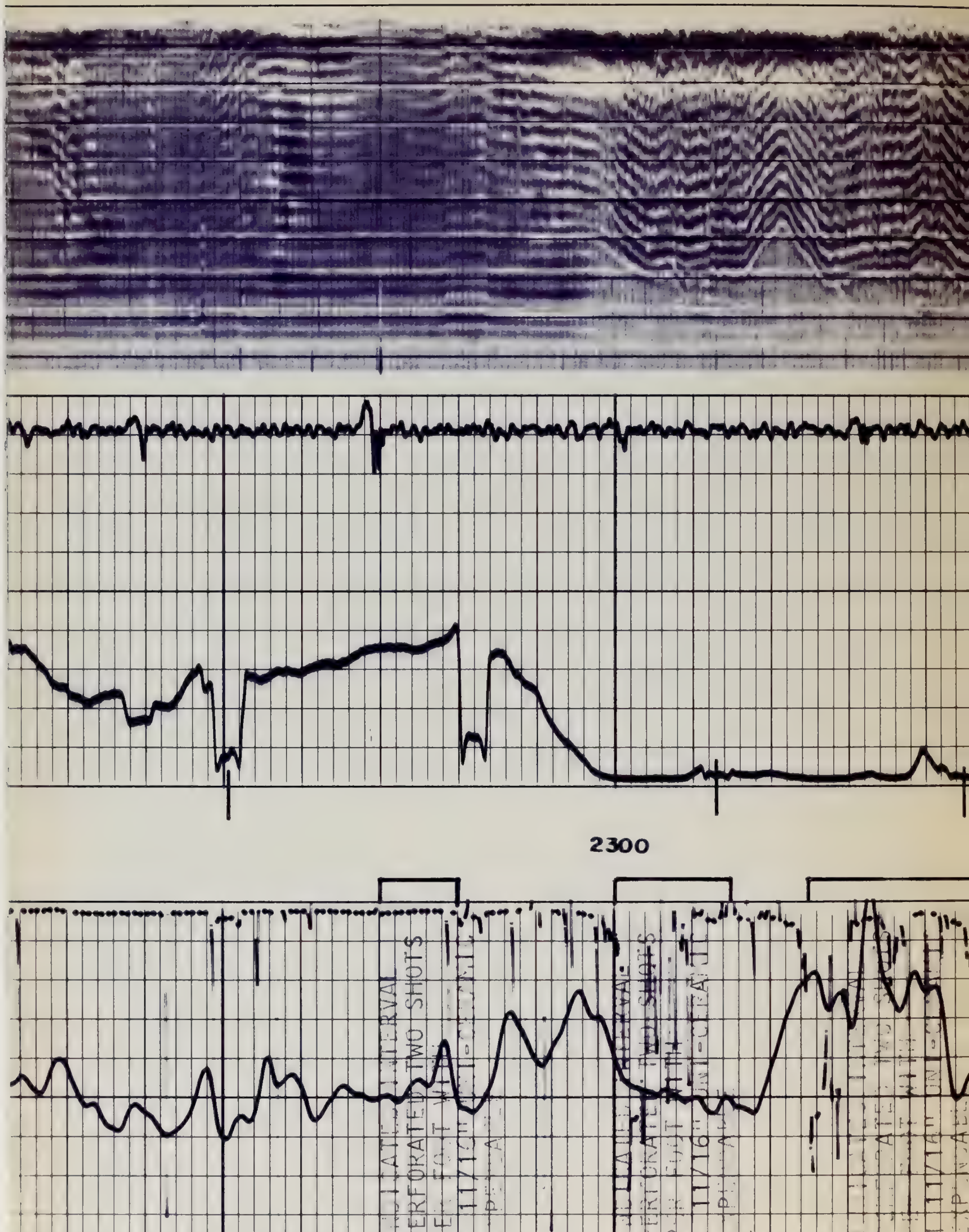

00
1700

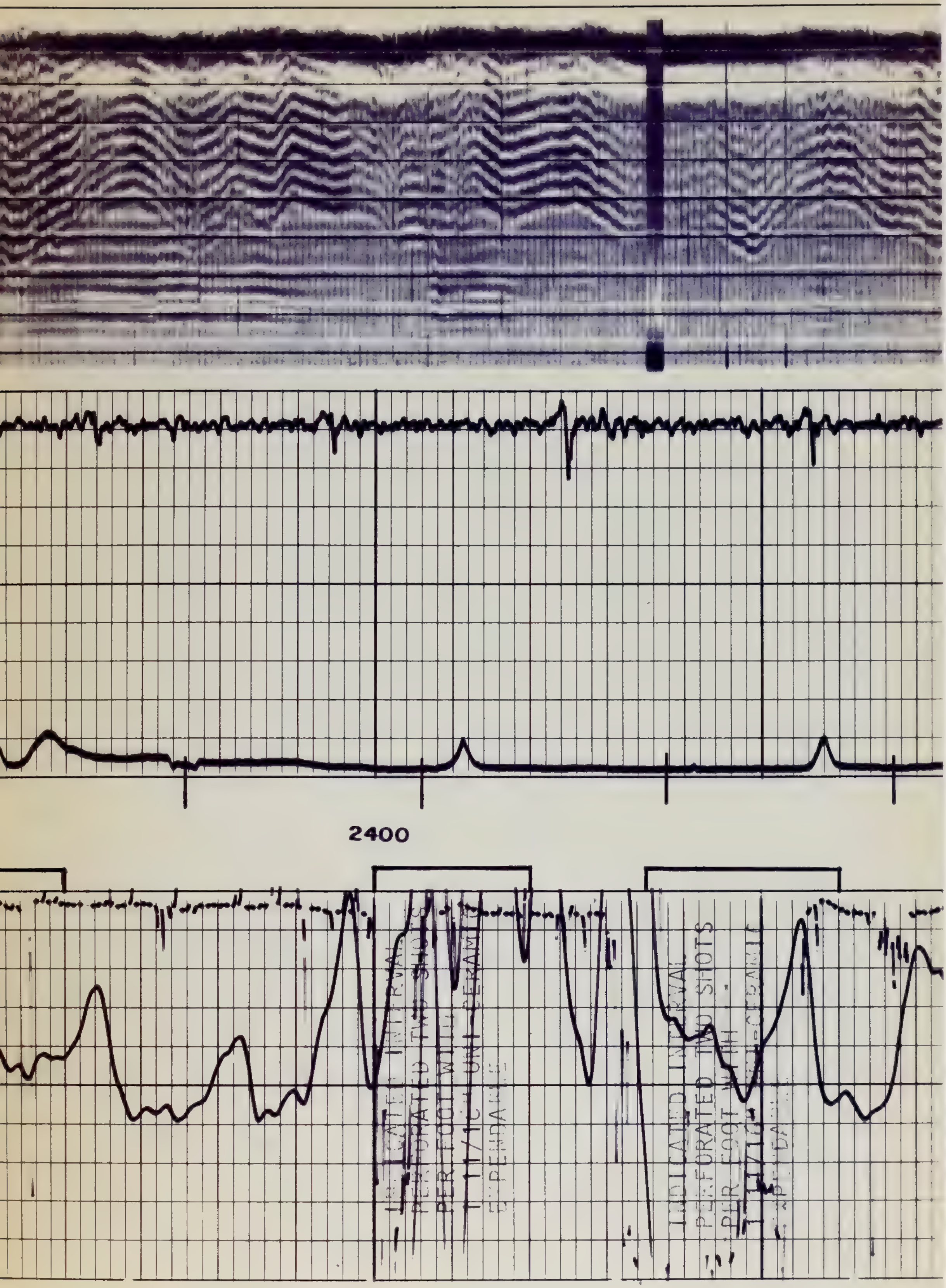

TREATED INTERVAL
PERFORATED 2 SHOT
PER FT. WITH 1-11/16
HYPERDOME
1800

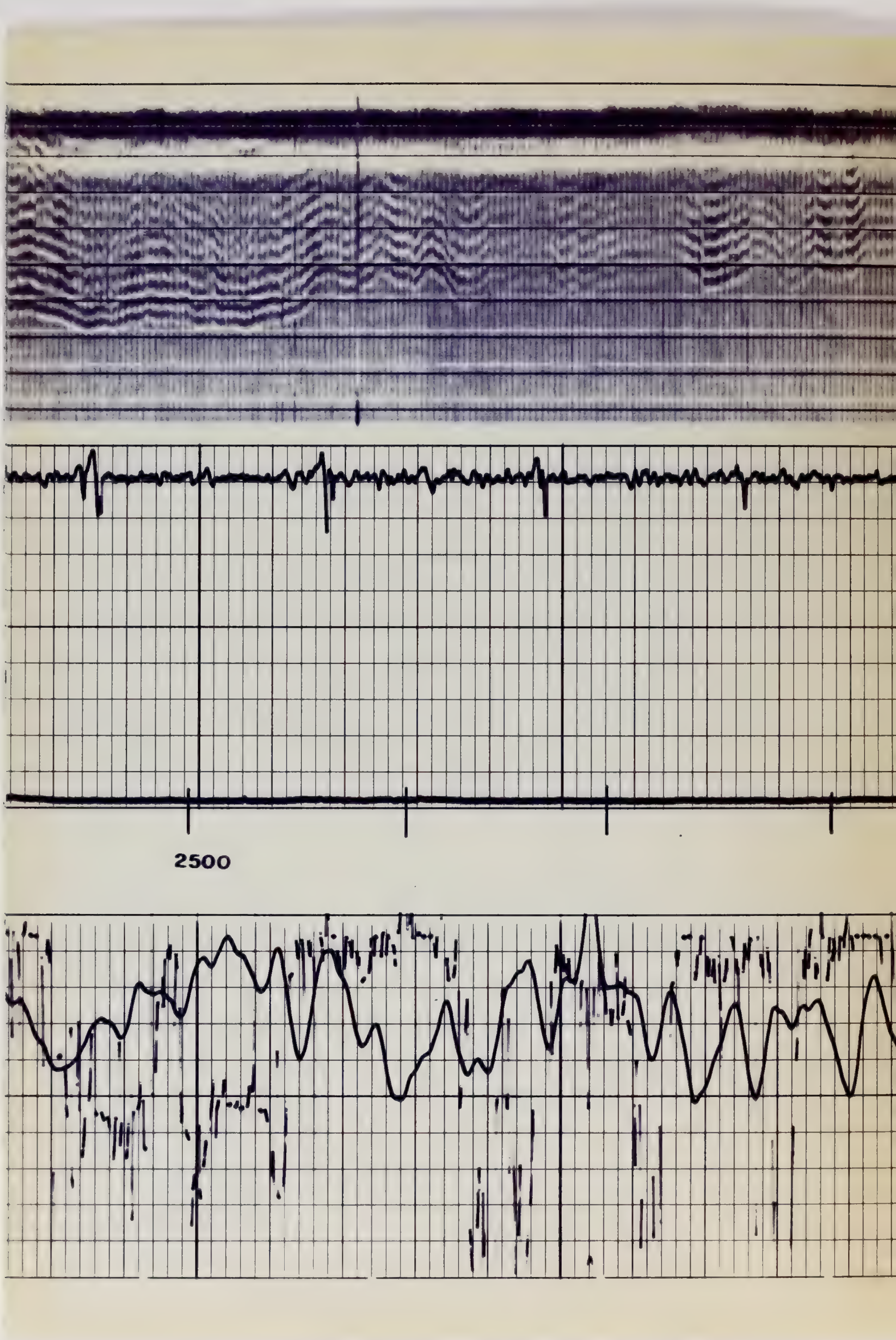

1900

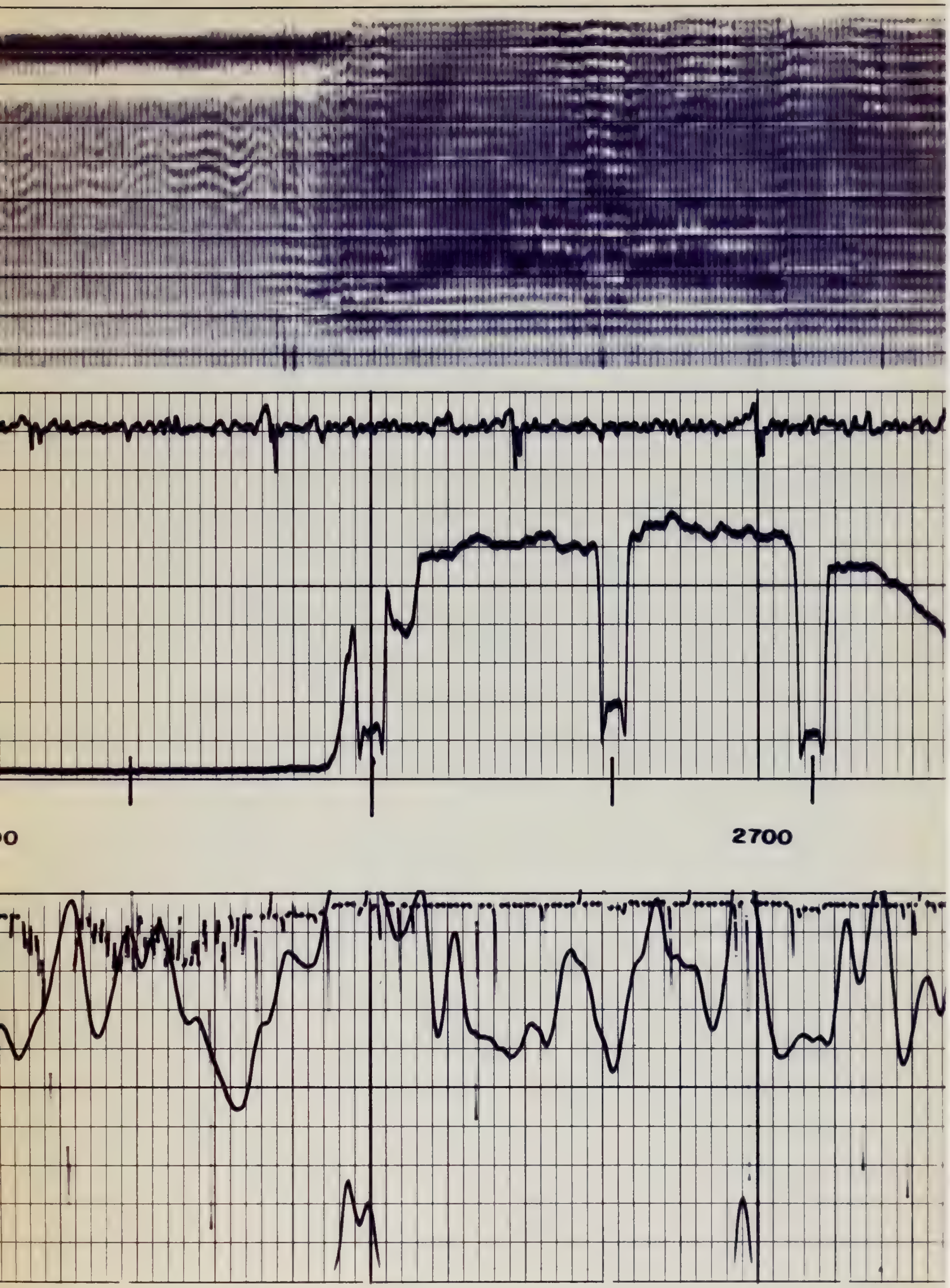

2000
INDICATED INTERVAL
PERFORATED SHOTS
UNI-CERAMIC EXPENDABLE

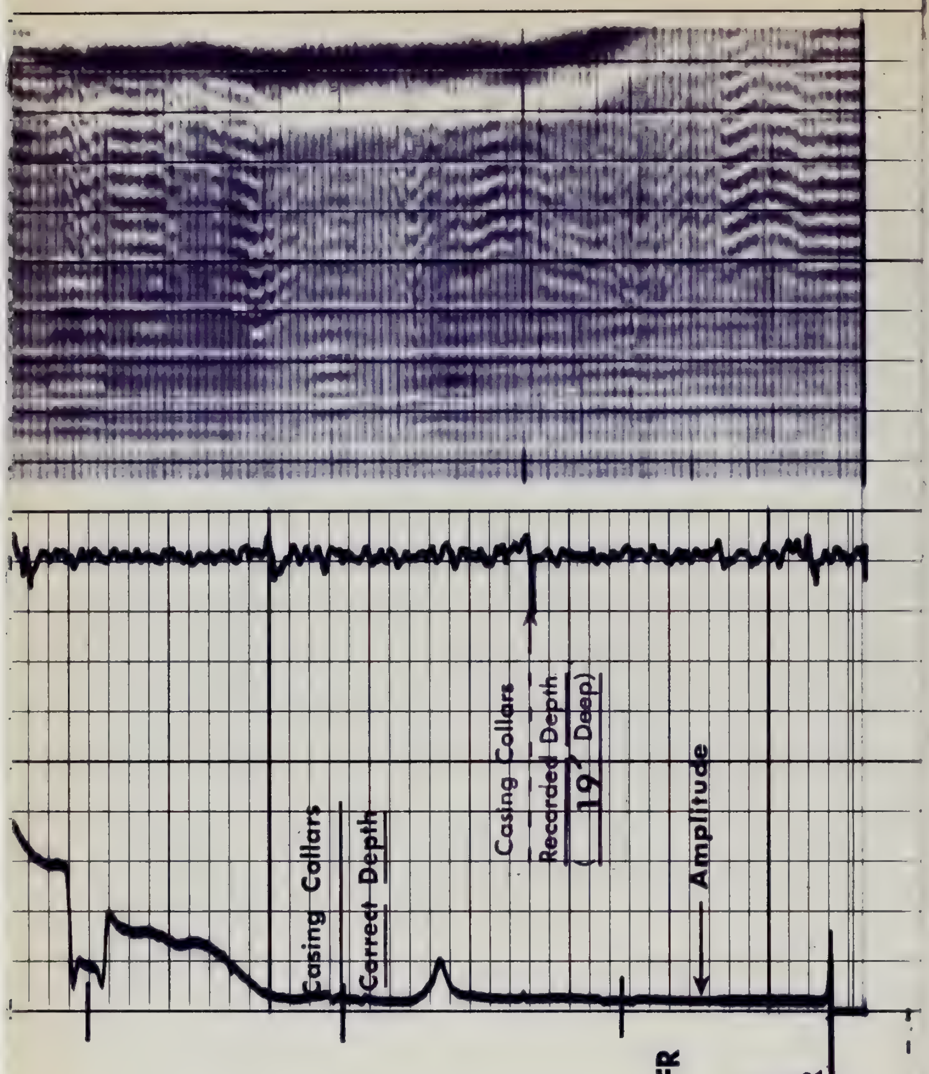

00
2200
PER FOOT WITH 11/16
U.I. CERAMIC
INDICATED INTERVAL
PERFORATED TWO SHOTS
PER FOOT WITH 11/16
U.I. CERAMIC EXPENDABLE

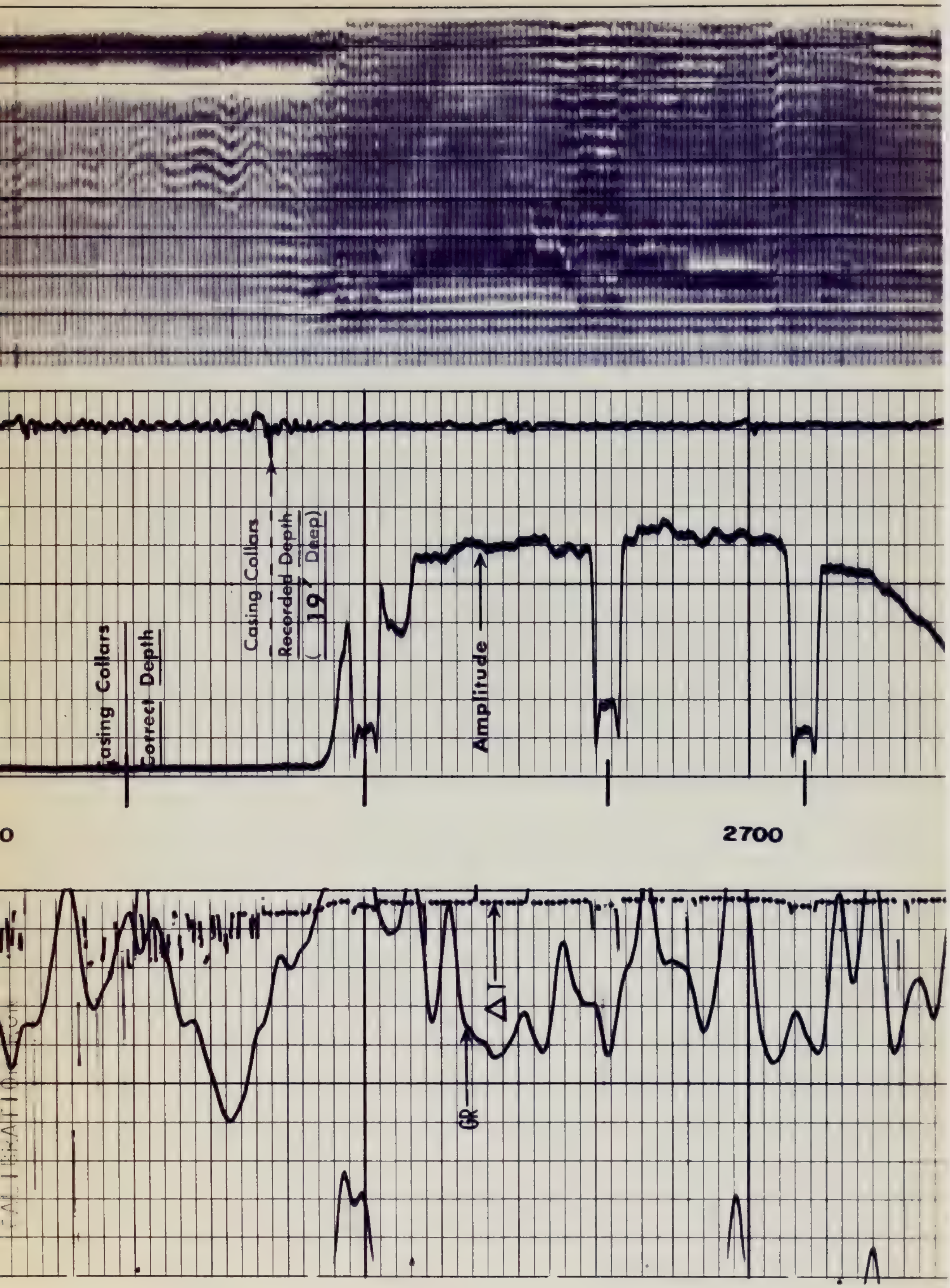

2300
INDICATED INTERVAL
PERFORATED TWO SHOTS
PER FOOT WITH
1 11/16" UNI-CERAMIC
EXPENDABLE
INDICATED INTERVAL
PERFORATED TWO SHOTS
PER FOOT WITH
1 11/16" UNI-CERAMIC
EXPENDABLE
INDICATED INTERVAL
PERFORATED TWO SHOTS
PER FOOT WITH
1 11/16" UNI-C
EXPENDABLE

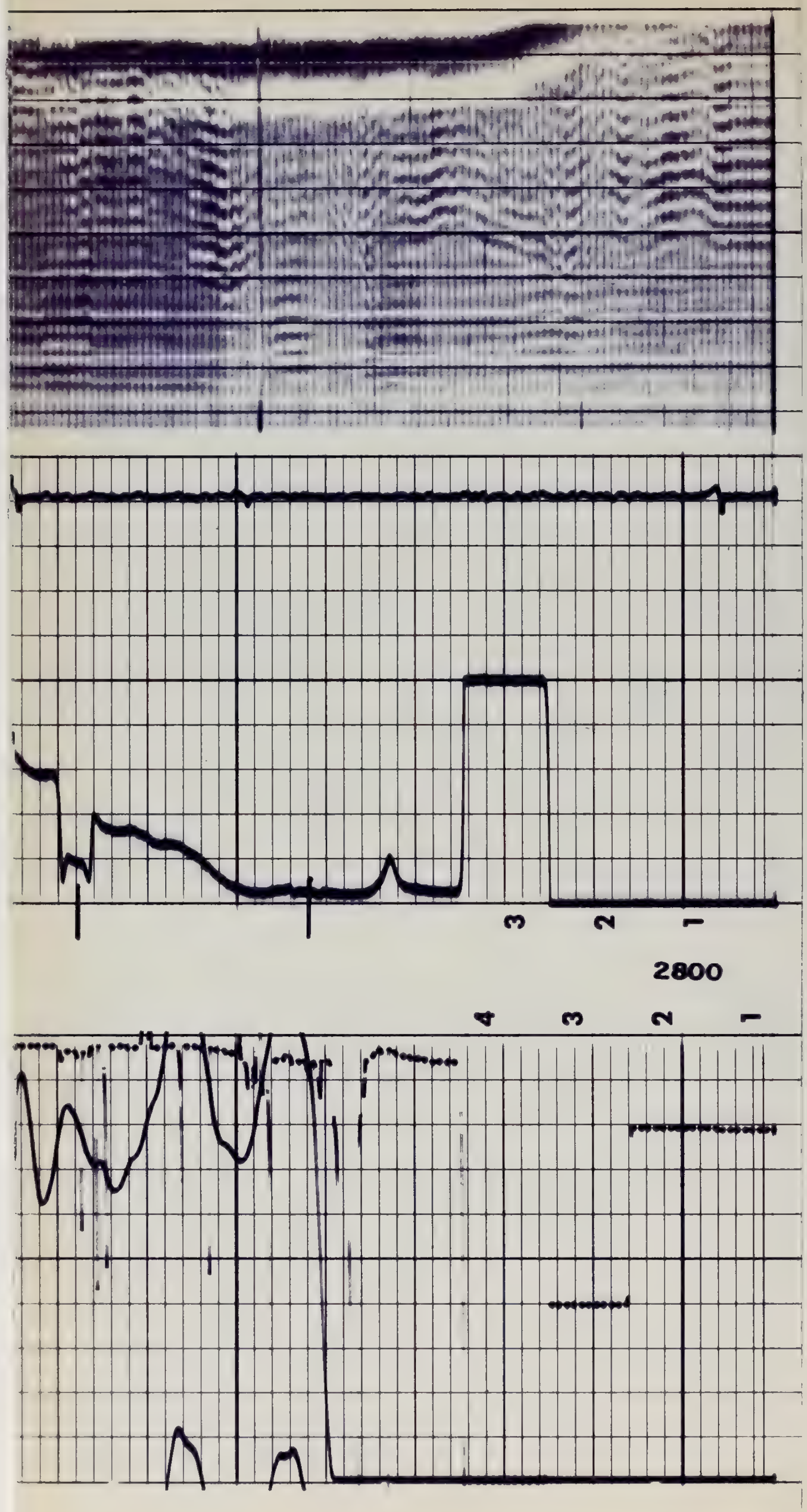

2400
INDICATED INTERVAL
PERFORATED TWO SHOTS
PER FOOT WITH
11/16 UNI-CERAMIC
EXPENDABLE
INDICATED INTERVAL
PERFORATED TWO SHOTS
PER FOOT WITH
11/16 UNI-CERAMIC
EXPENDABLE

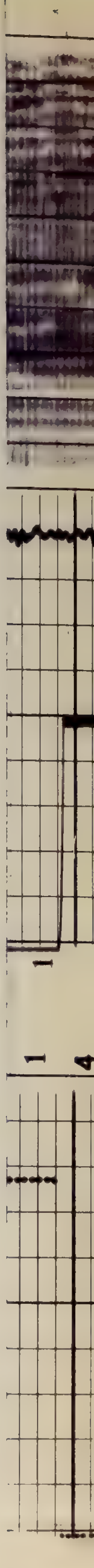

2500

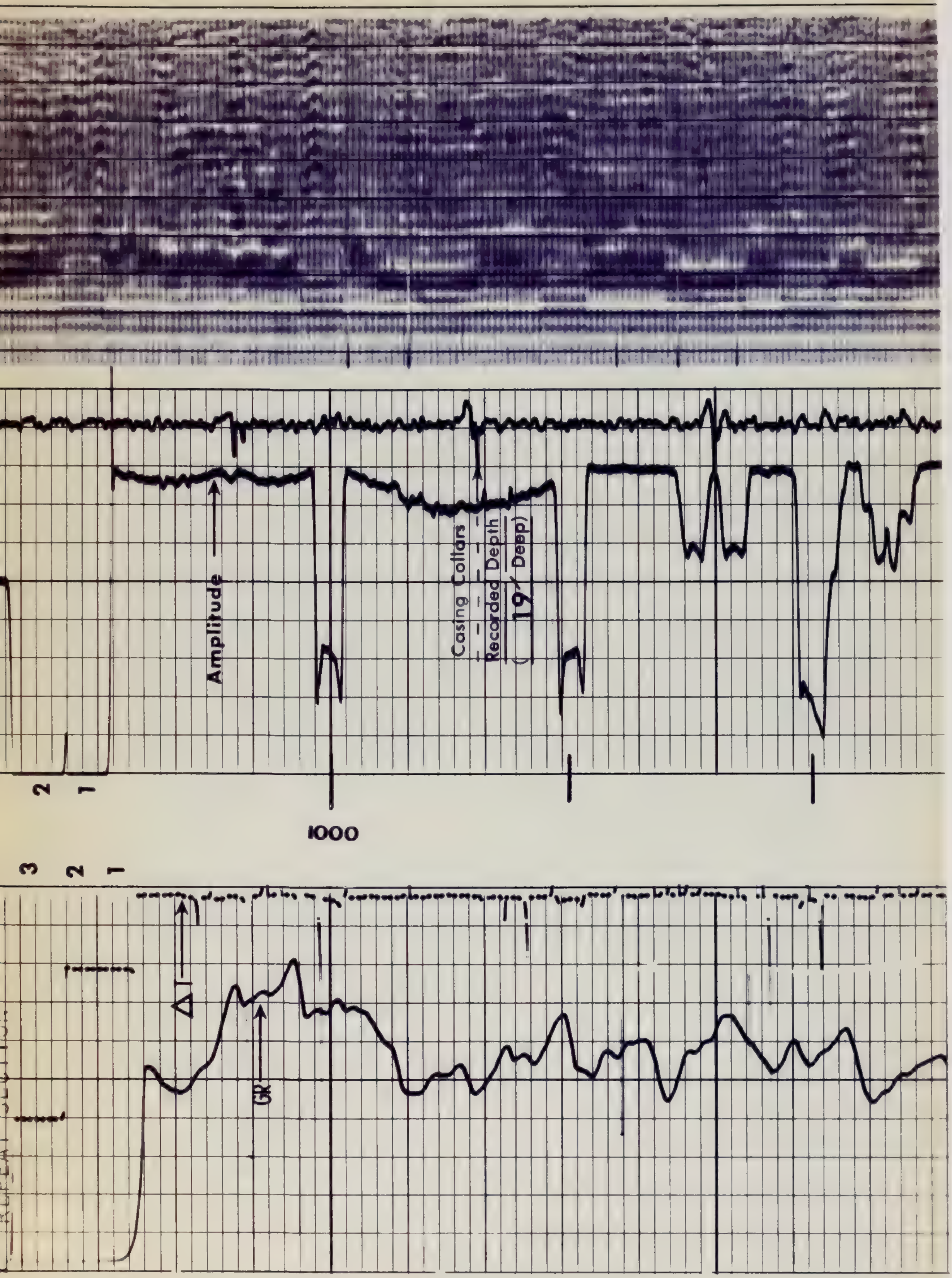

2700

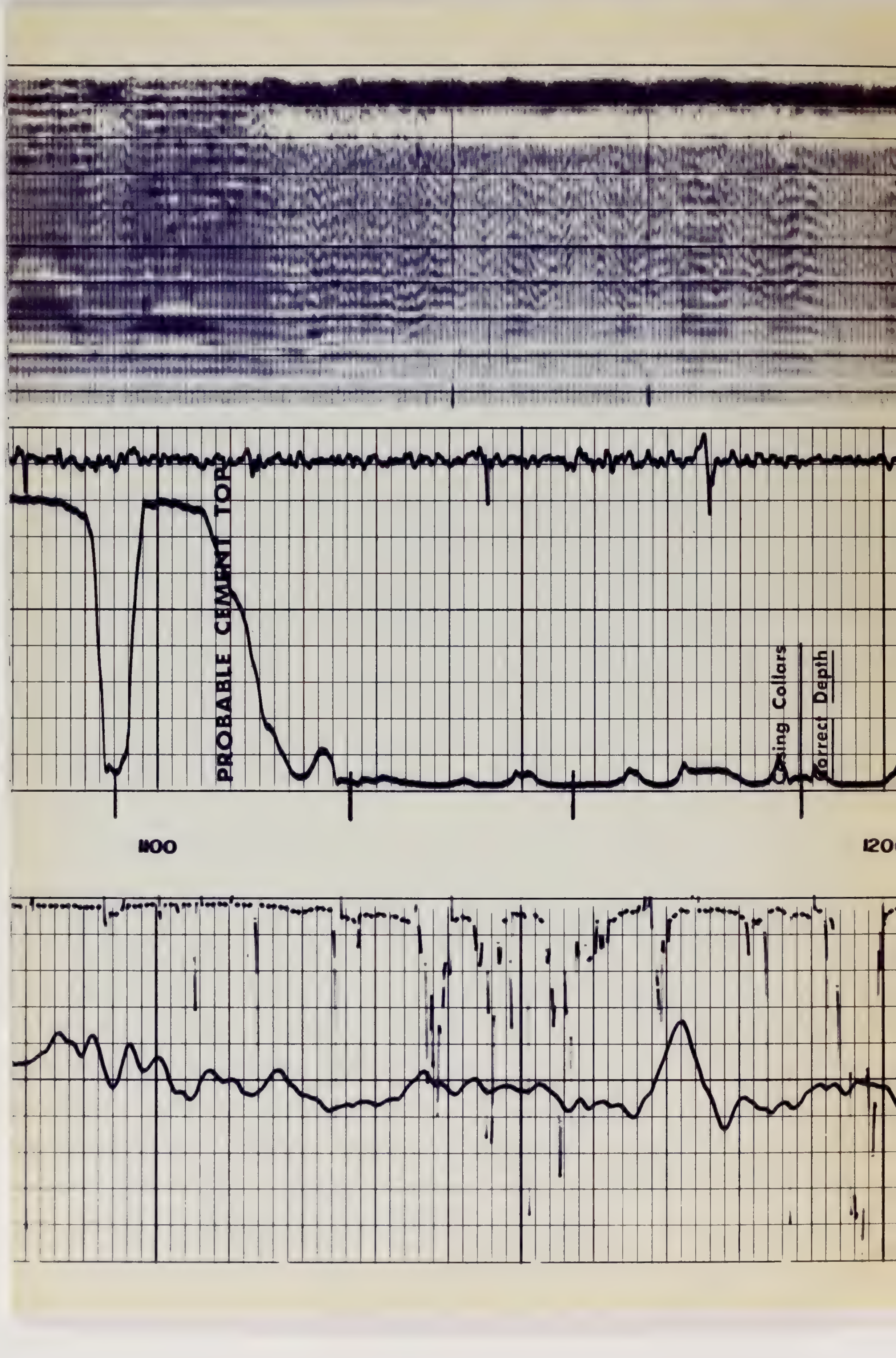

Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(19' Deep)
Amplitude
GR FR
2800
GR
ΔT

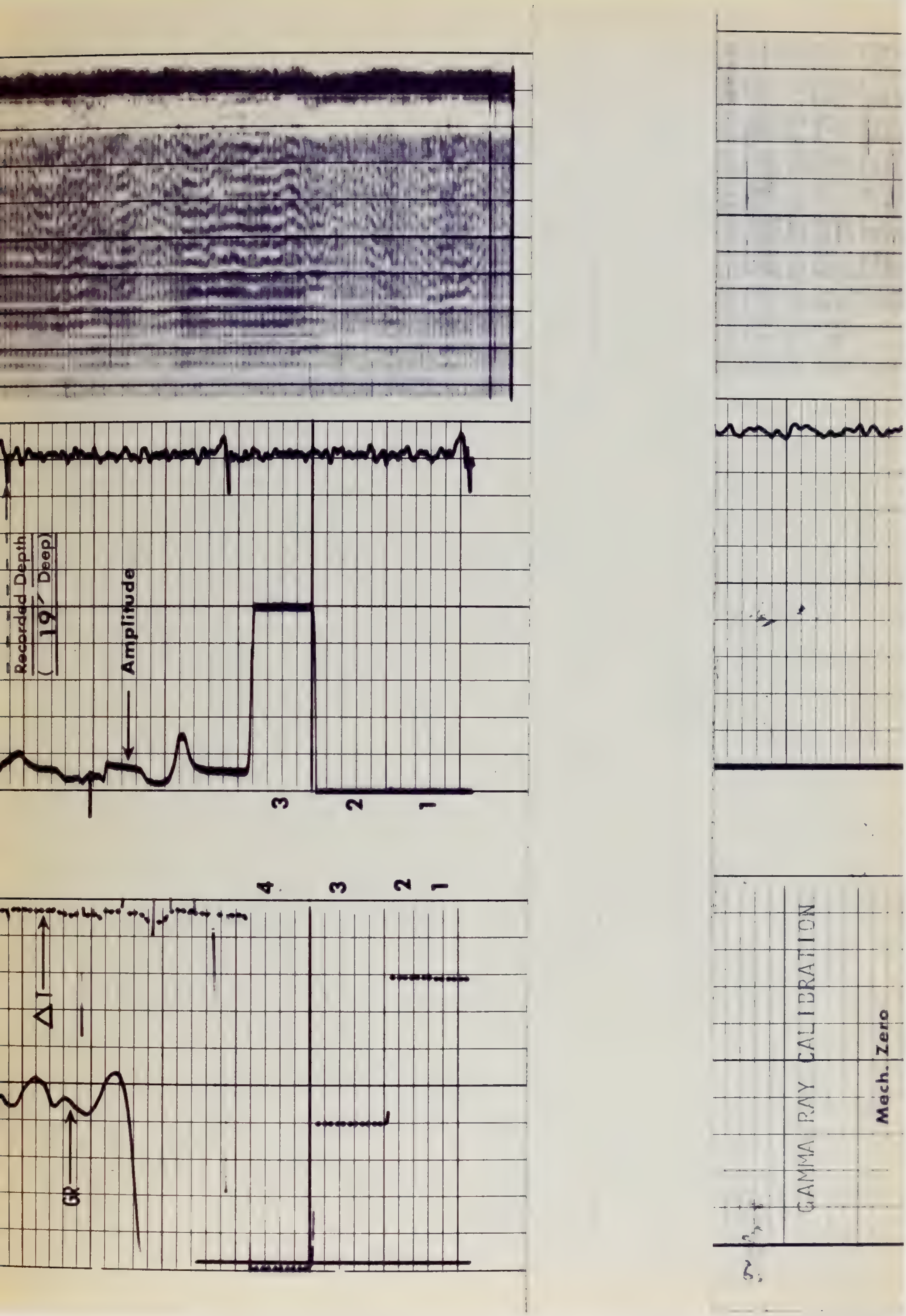

asing Collars
Correct Depth
Casing Collars
Recorded Depth
(19' Deep)
Amplitude
0
2700
ΔT
GR

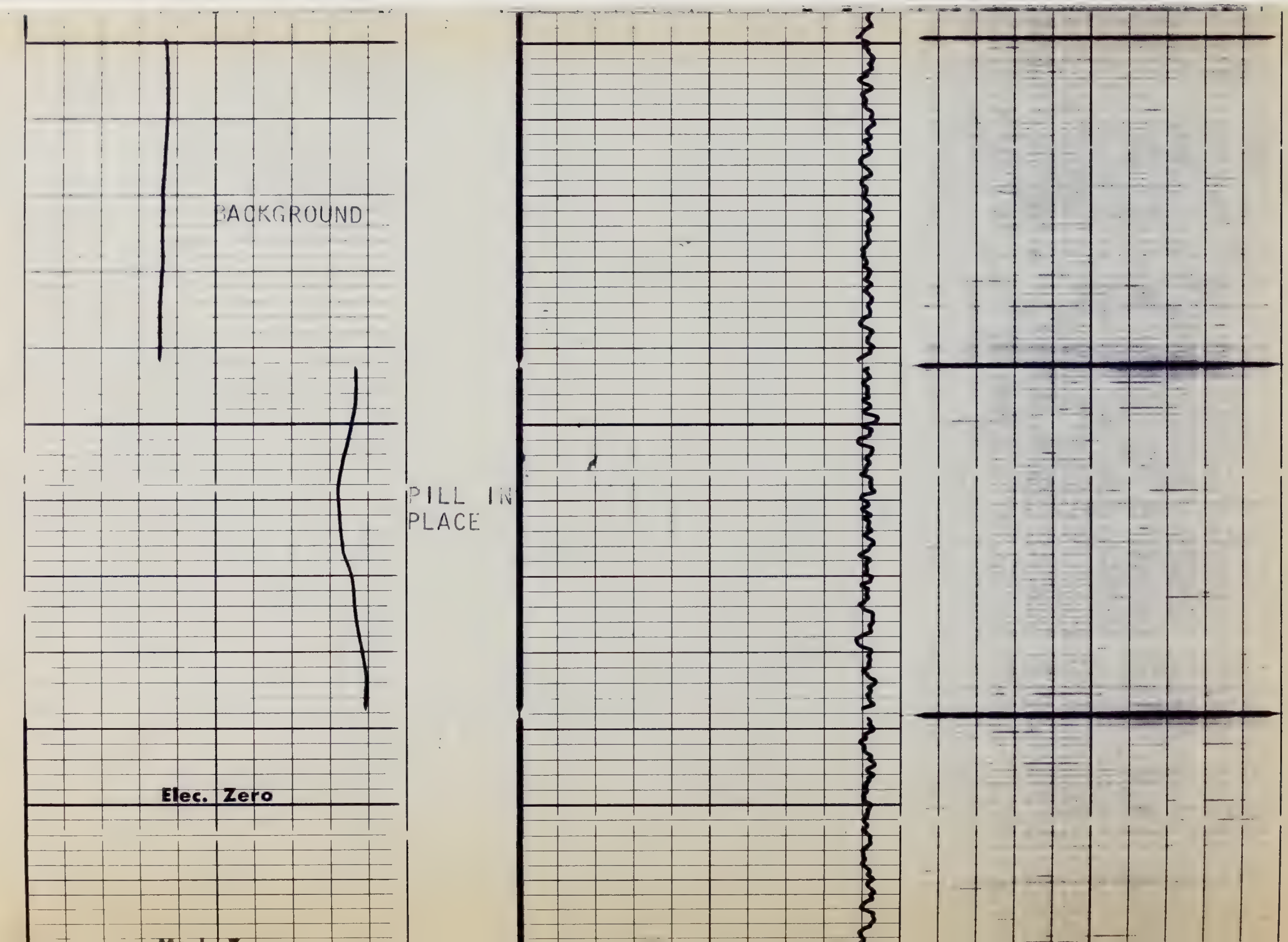

3
2
1
2800
4
3
2
1

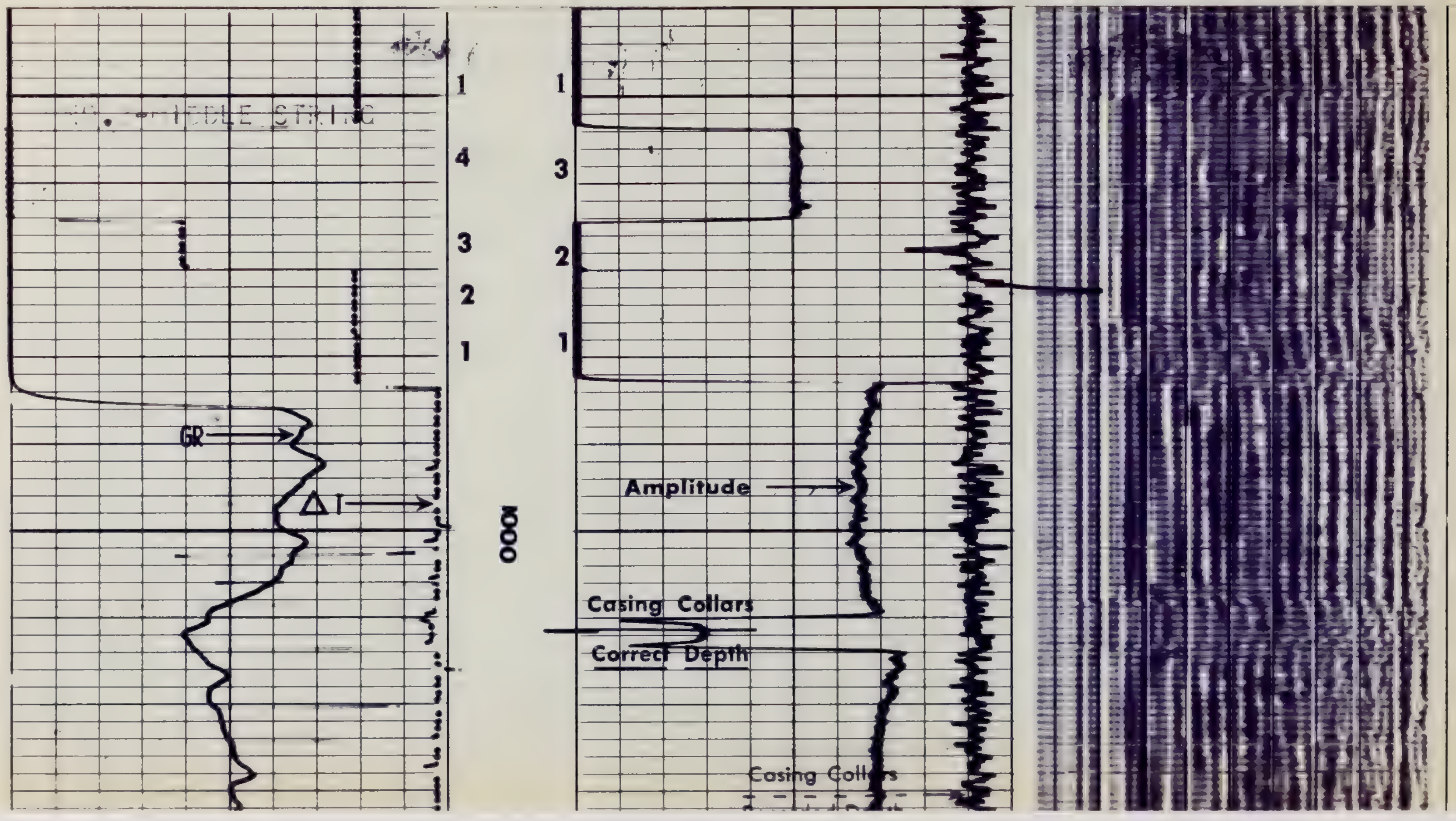

1
1
4

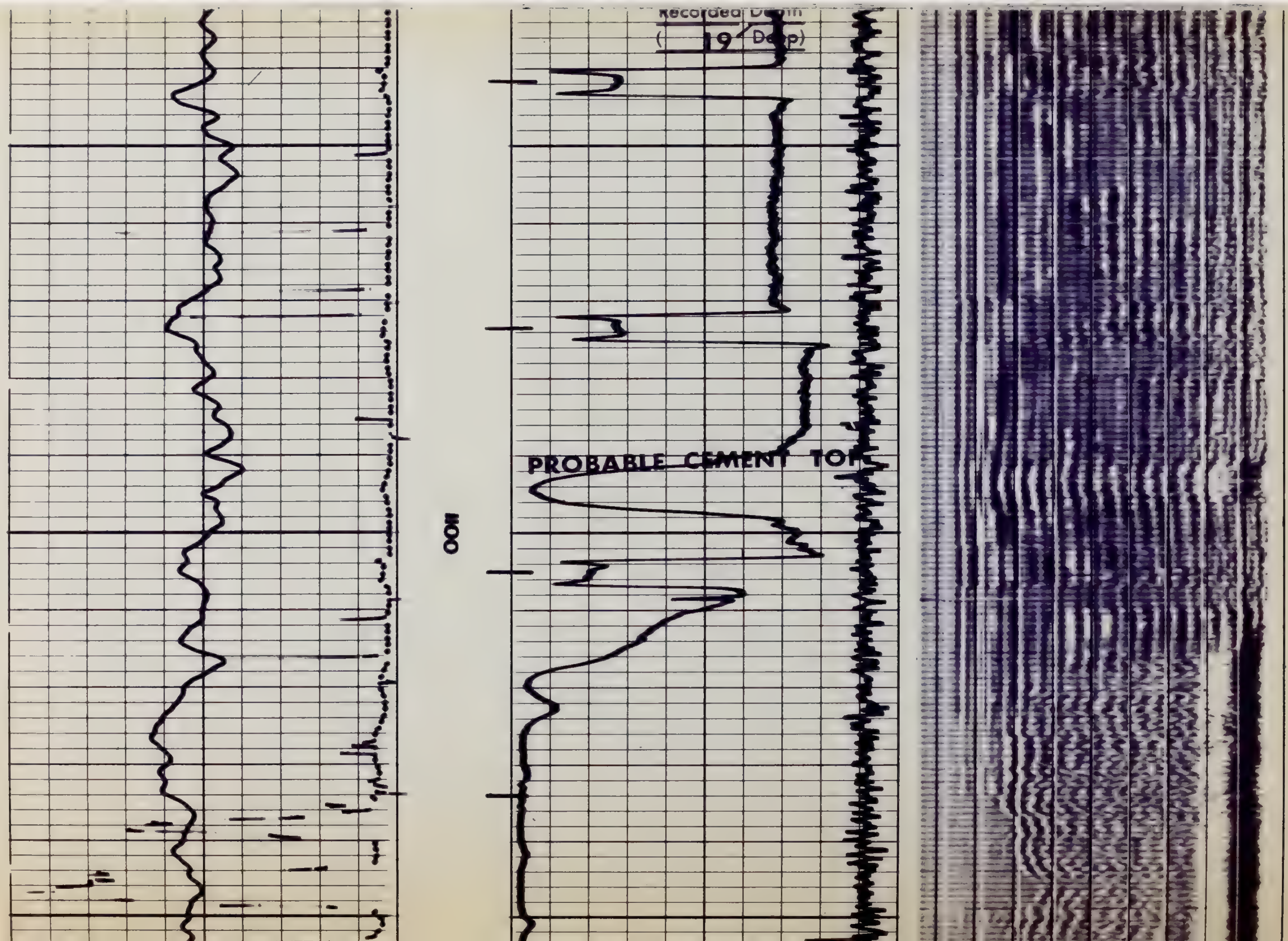

Amplitude
Casing Collars
Recorded Depth
(19' Deep)
1000
ΔT
GR
1
2
3

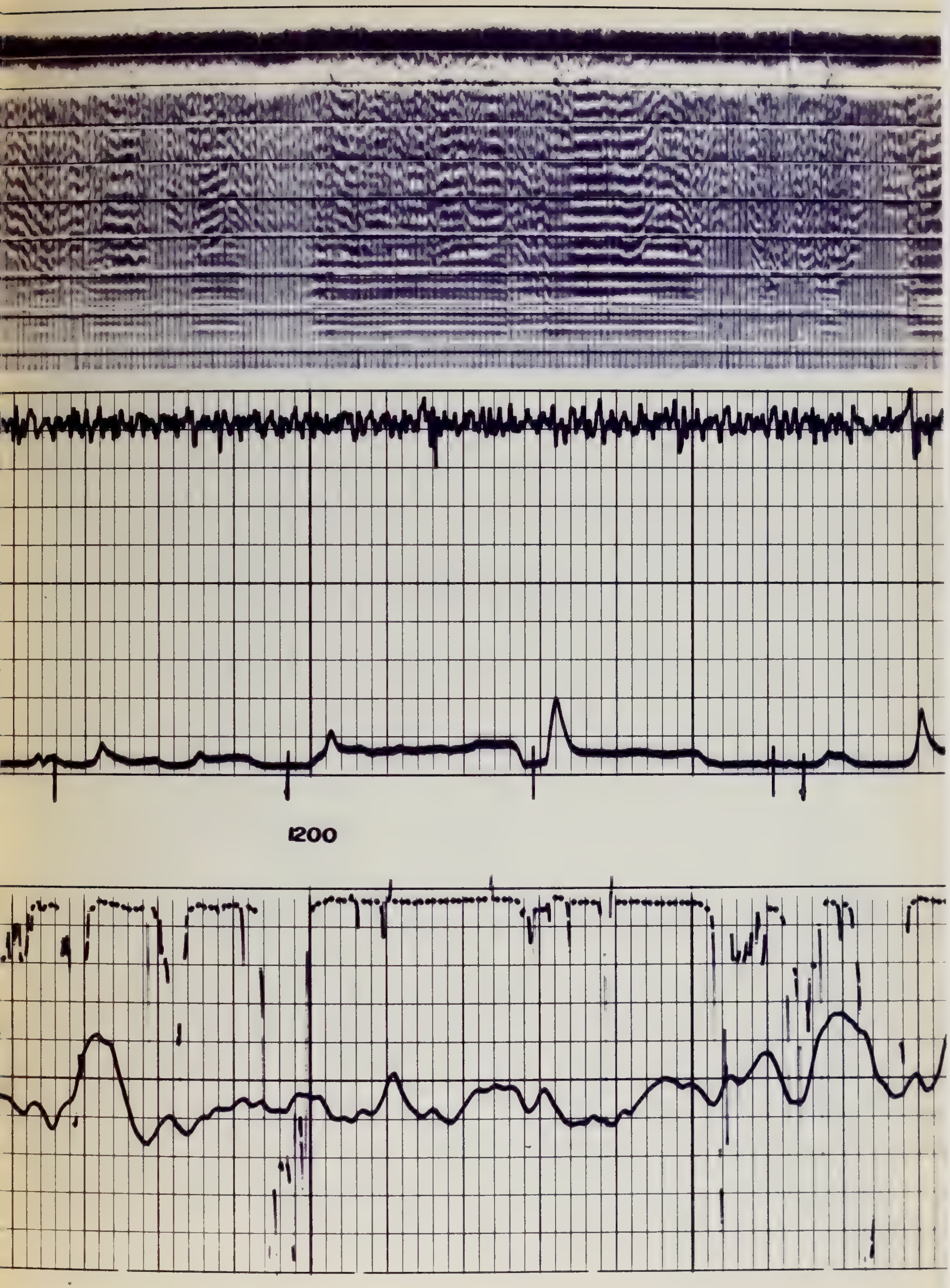

PROBABLE CEMENT TOP
Casing Collars
Correct Depth
1100
120

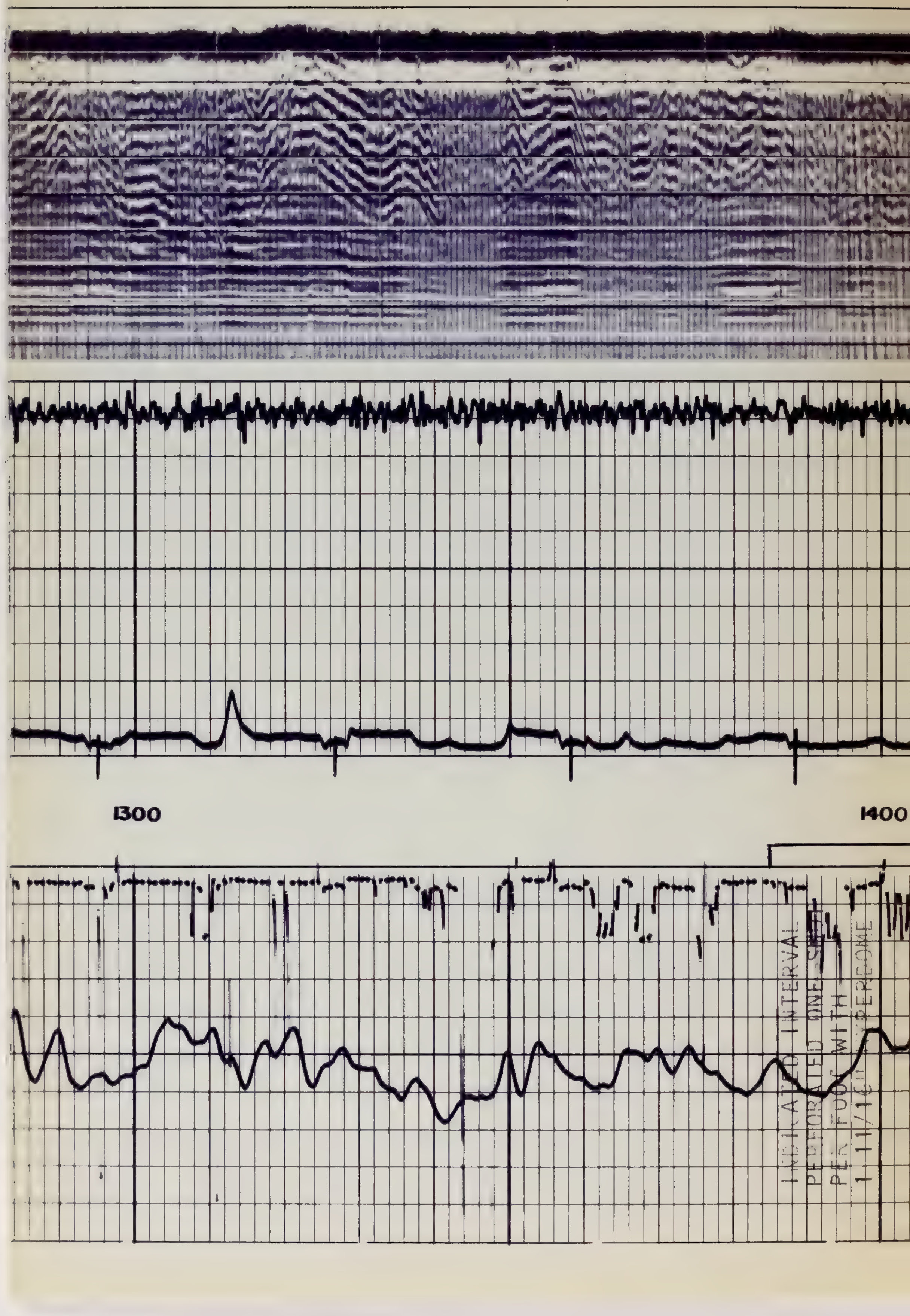

Recorded Depth
(19' Deep)
Amplitude
3
2
1
4
3
2
1
ΔT
GR
GAMMA RAY CALIBRATION
Mach. Zero

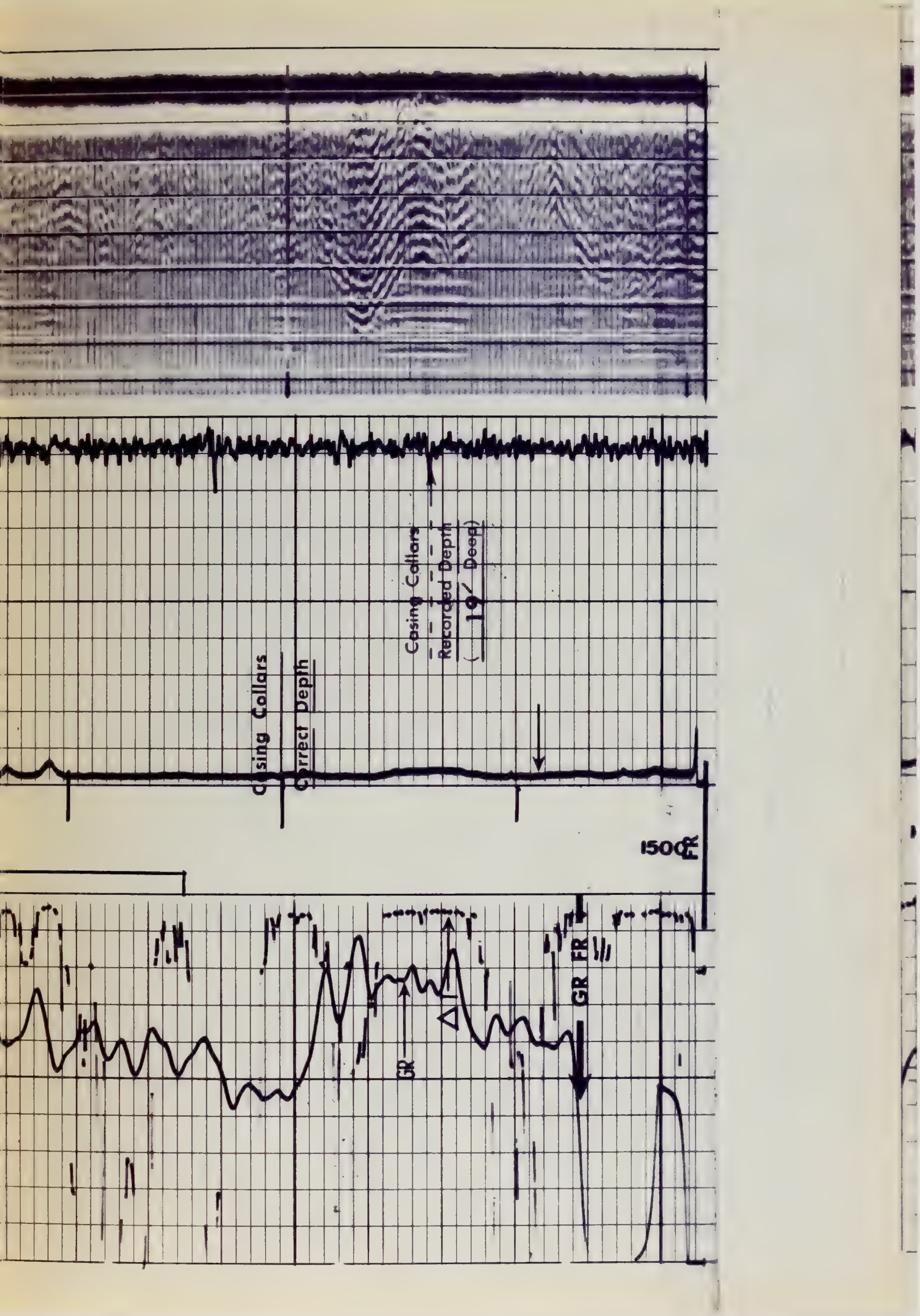

BACKGROUND
PILL IN
PLACE
Elec. Zero

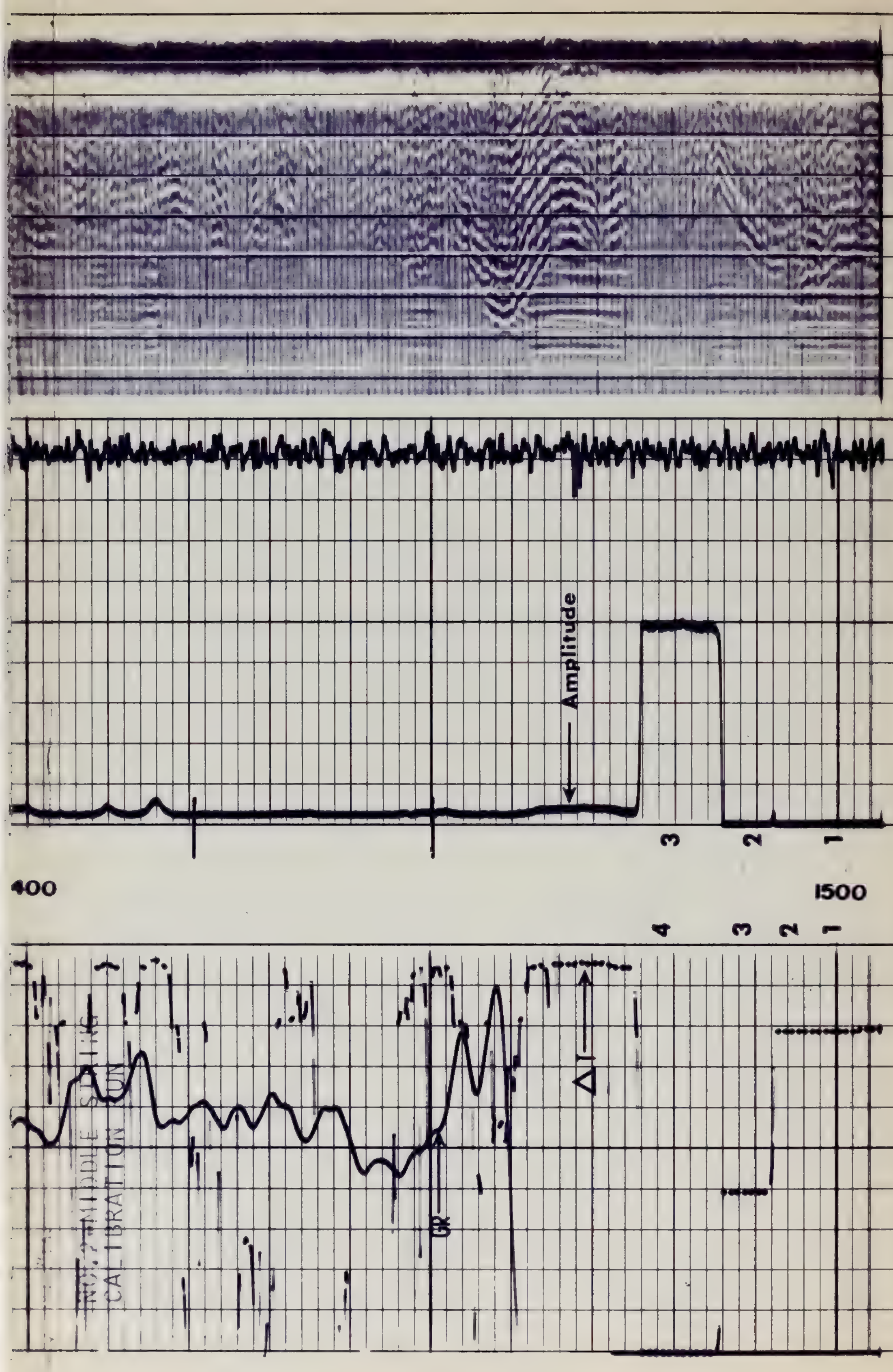

MIDDLE STRING
1
4
3
2
1
GR
ΔT
1000
1
3
2
1
Amplitude
Casing Collars
Correct Depth
Casing Collars


Recorded Depth
(19' Deep)
PROBABLE CEMENT TOP
1100

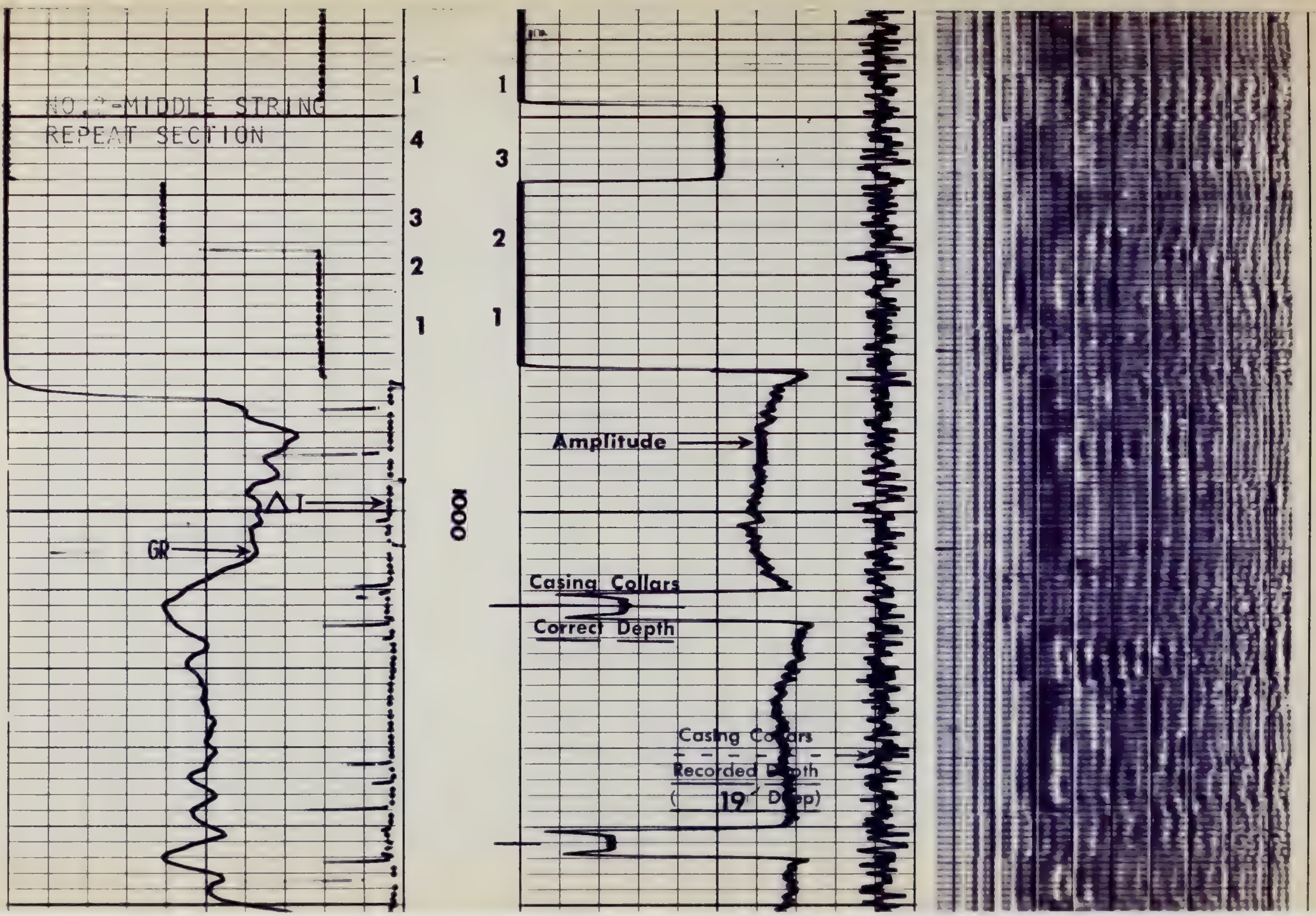

1200

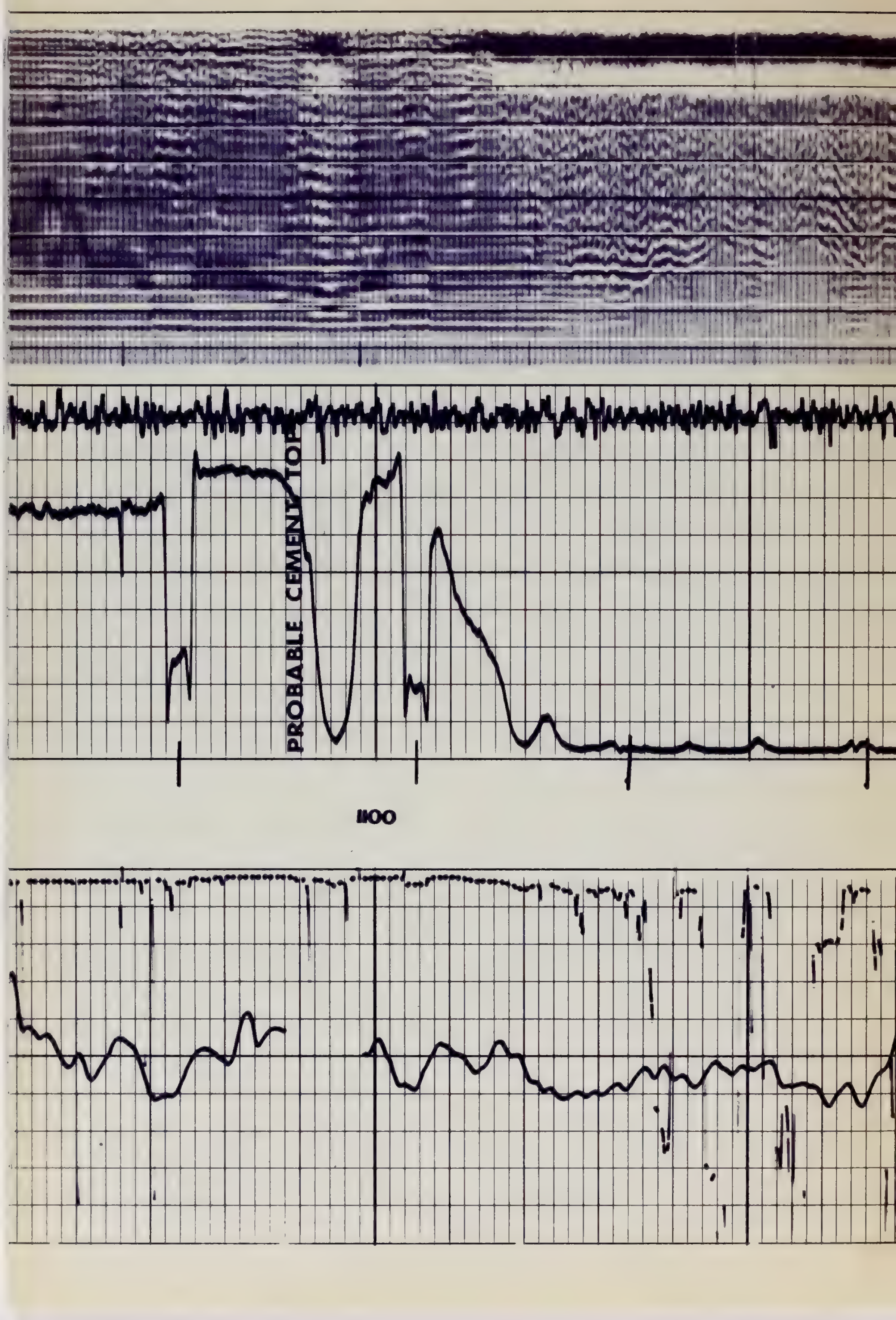

1300
1400
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH
1 11/16" PERFCOME

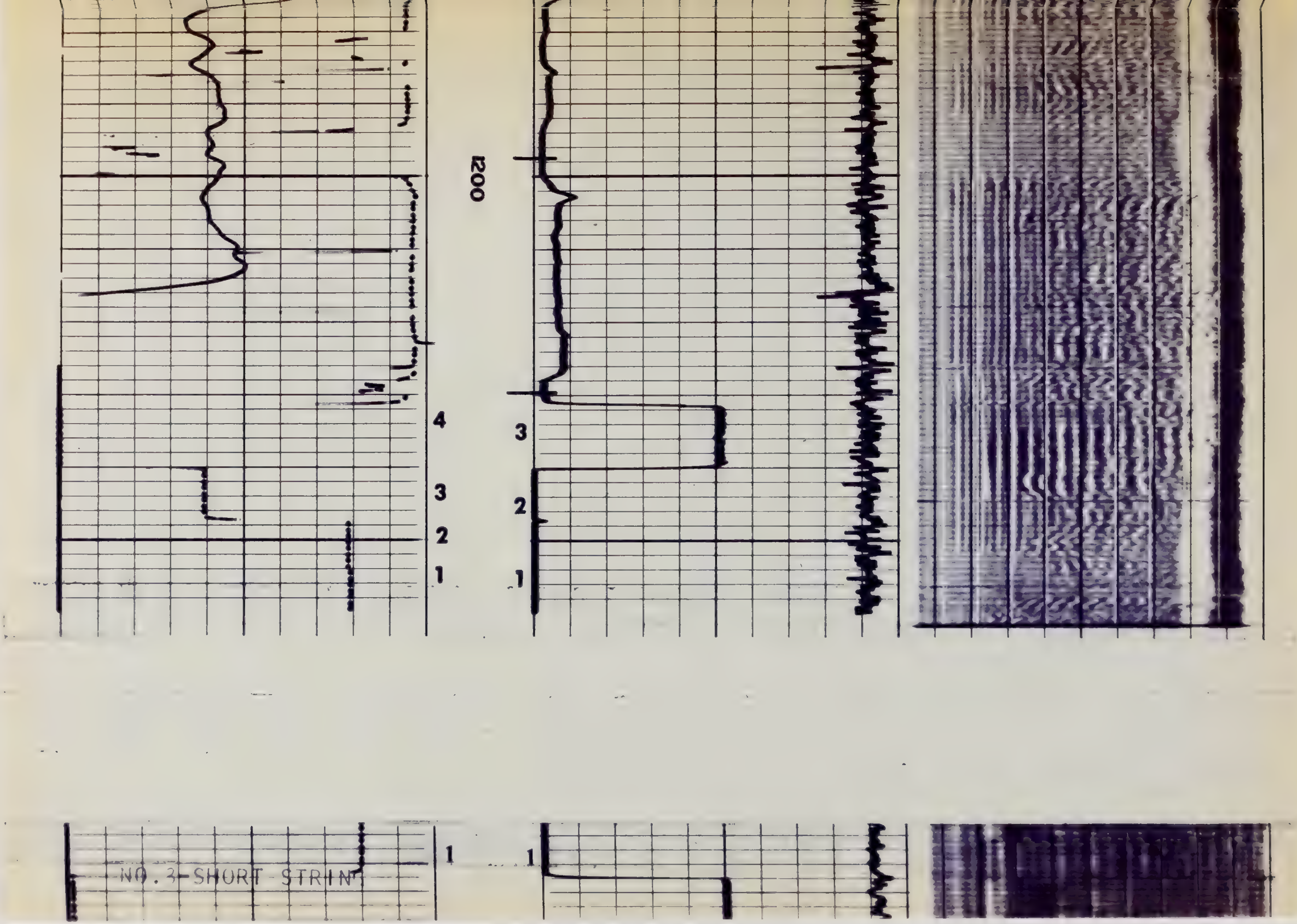

Casing Collars
Recorded Depth
(19' Deep)
Casing Collars
Correct Depth
1500
FR
GR FR
GR

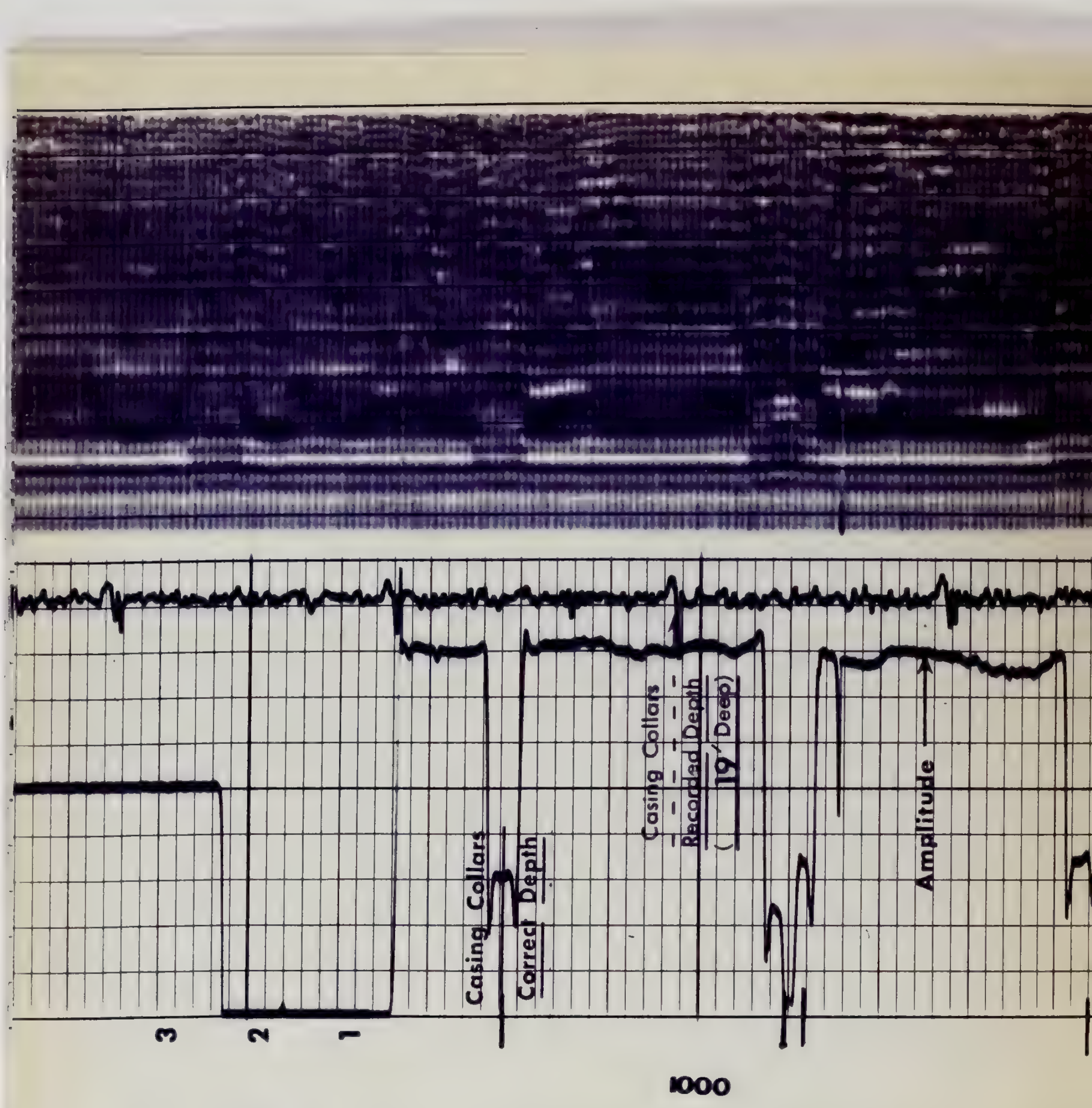


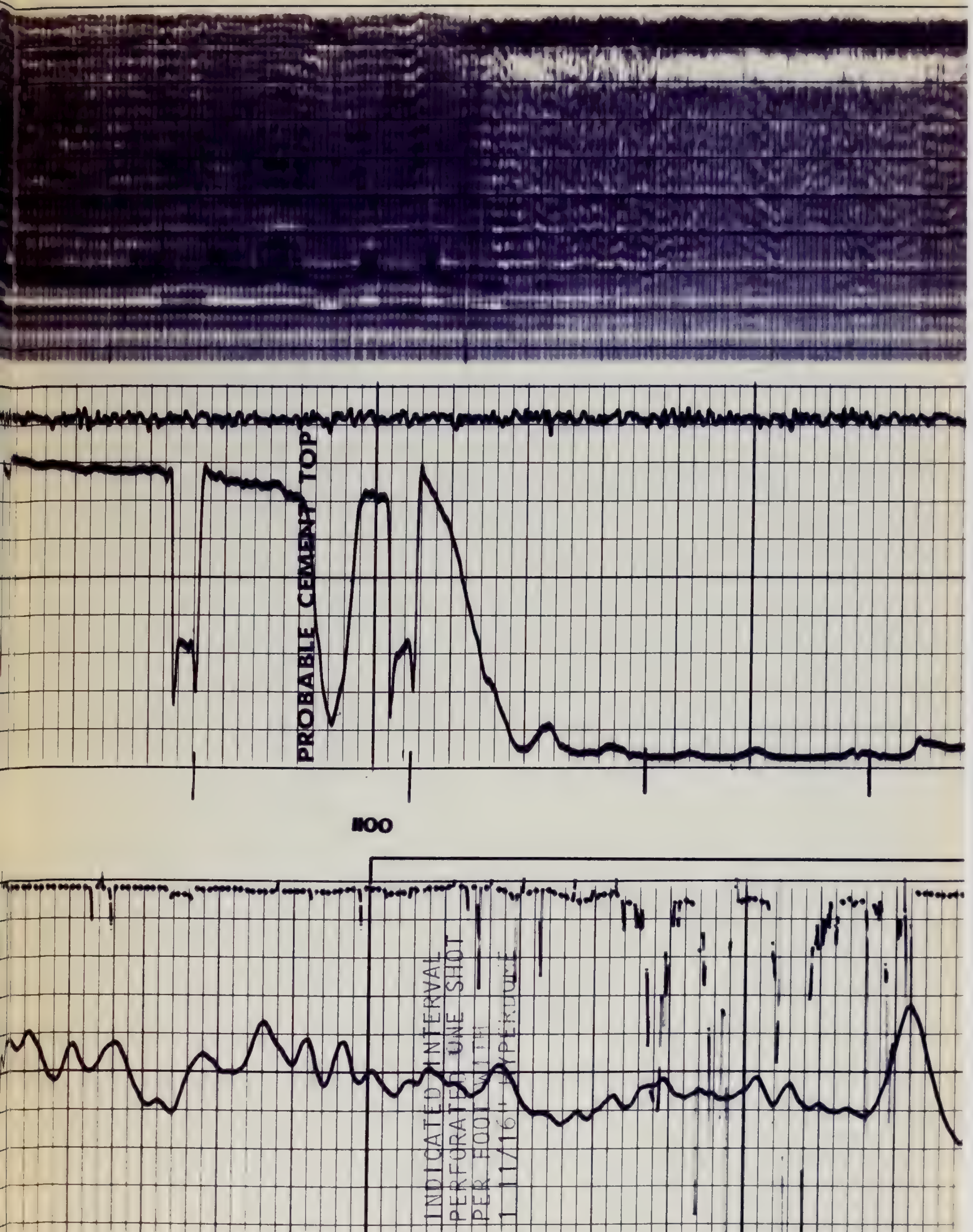
Amplitude
3
2
1
400
1500
4
3
2
1
ΔT
GR
NO. 2 MIDDLE STRING
CALIBRATION RUN

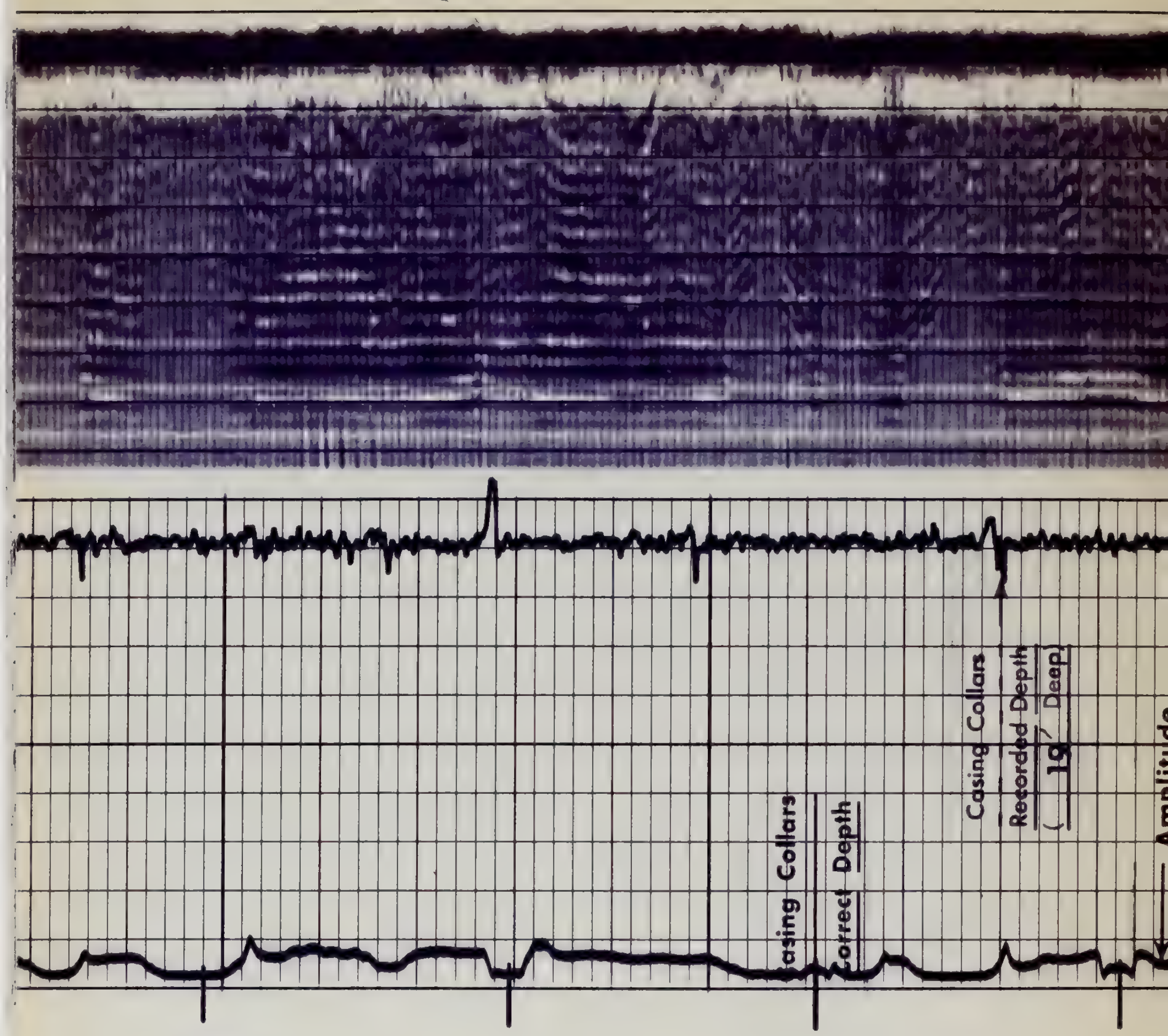

NO.2-MIDDLE STRING
REPEAT SECTION
1
4
3
2
1
ΔT
GR
1000
1
3
2
1
Amplitude
Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(19' Deep)

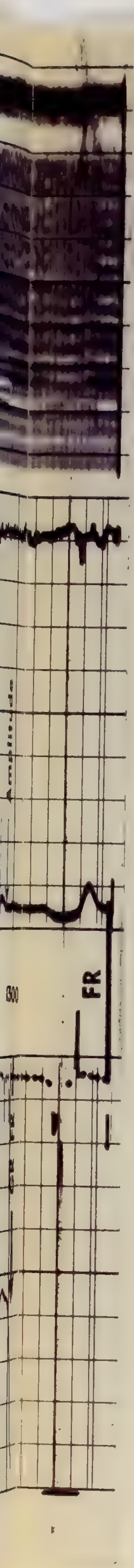

PROBABLE CEMENT TOP
1100

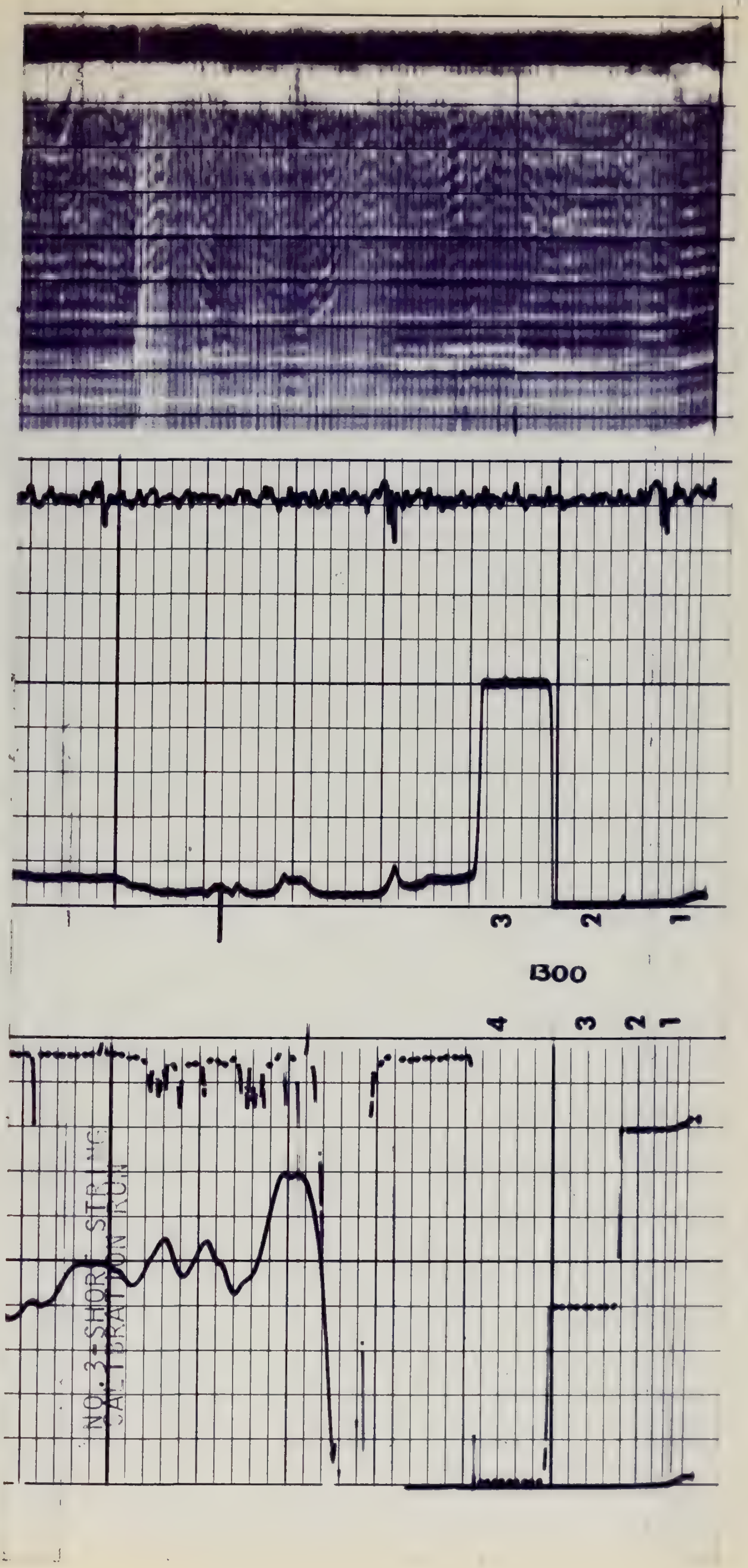

1200
4
3
2
1
3
2
1
1
1
NO. 3-SHORT STRAIN

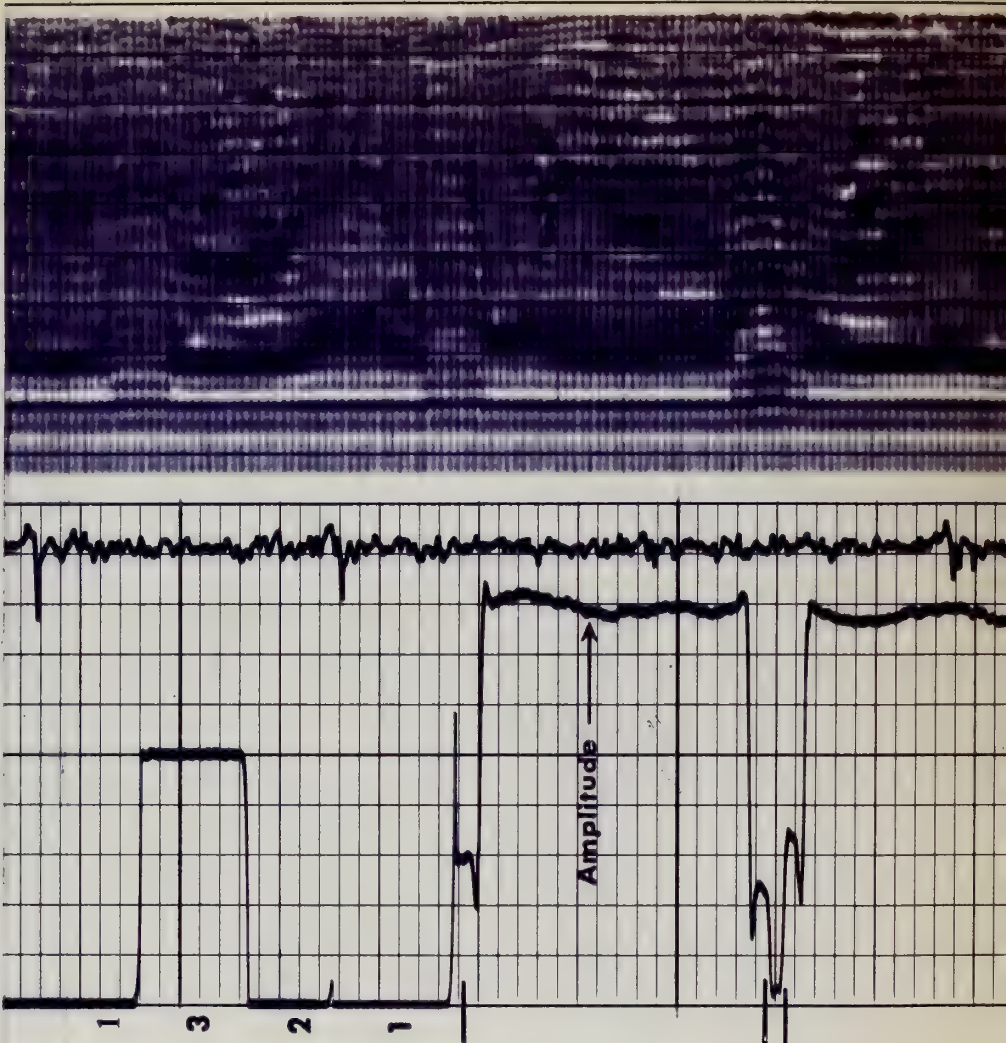

Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(19' Deep)
Amplitude
3
2
1
1000
4
3
2
1
ΔT
GR

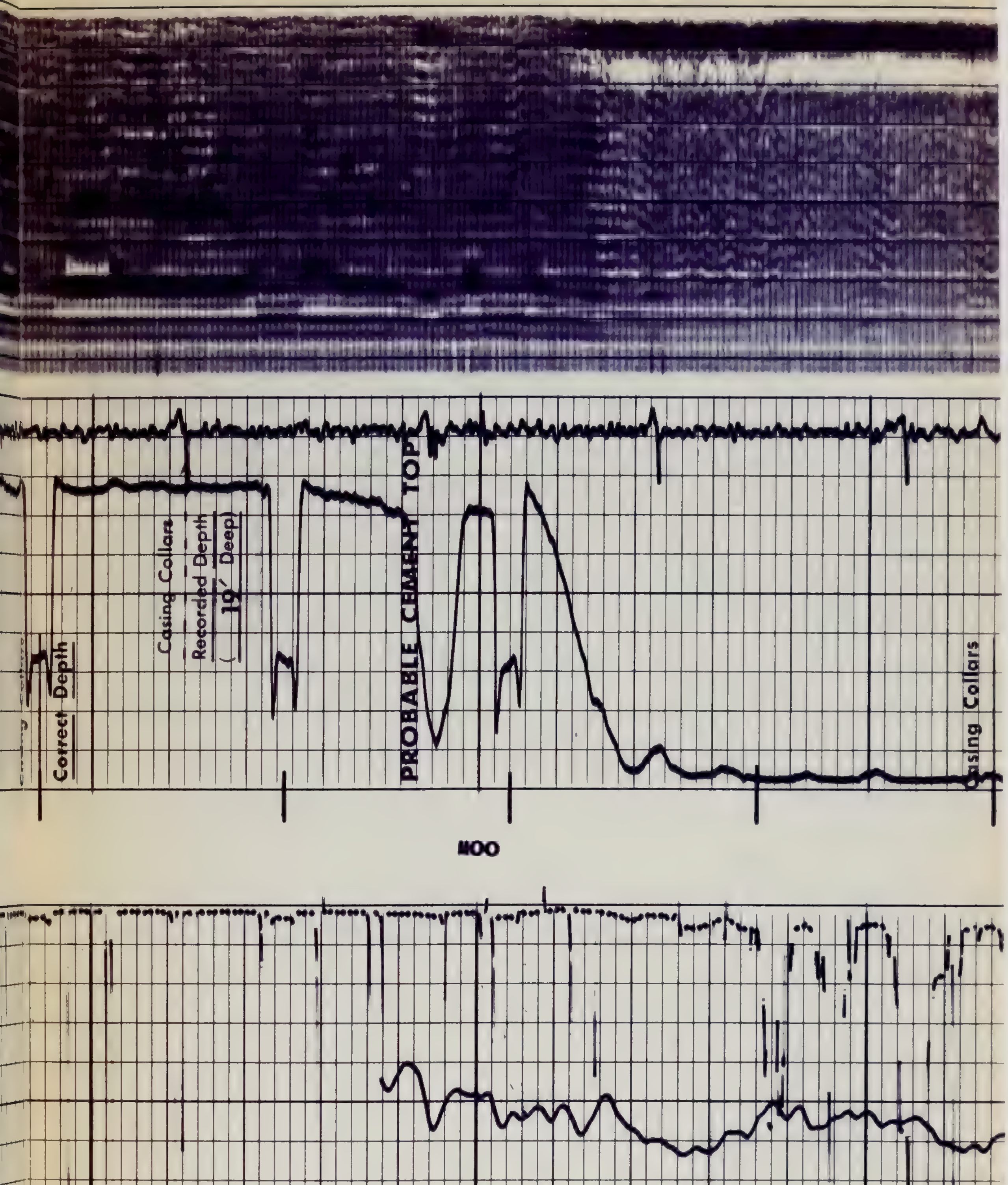

PROBABLE CEMENT TOP
1100
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH
1 11/16" HYPERDOME

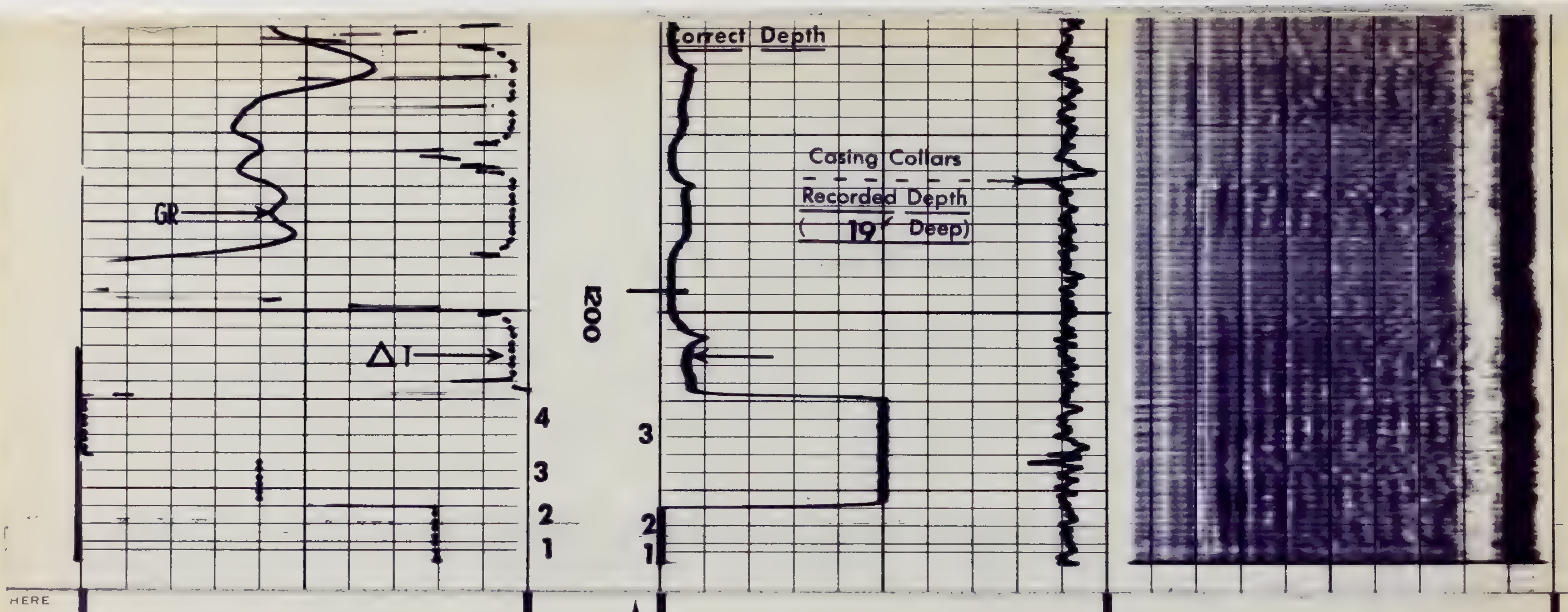

1200
asing Collars
orrect Depth
Casing Collars
Recorded Depth
(19' Deep)
Amplitude
ΔT
GR


Amplitude
1300
FR


3
2
1
1300
4
3
2
1
NO. 3 - SHORT STRING
CAL. VIBRATION RUN


Amplitude
1000
ΔT
GR
SHORT STRING
REPEAT SECTION
1
3
2
1
1
4
3
2
1


Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(19' Deep)
PROBABLE CEMENT TOP
Casing Collars
1100



Casing Collars
Corrected Depth

TRANSIT TIME

MICROSECONDS ________ SPACING
400 200

GAMMA RAY API UNITS

DEPTH

CASING BOND

MILLIVOLTS
0 100

VARIABLE DENSITY

MICROSECONDS 5 FT SPACING
200 1200

COMPANY ATLANTIC RICHFIELD COMPANY SCHL. FR 2804

COMPANY ATLANTIC RICHFIELD COMPANY
WELL [illegible]

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

[illegible]

Elev:
KB ----
DF ----
GL 6900

CEMENT BOND CALIBRATION CODING

	Δt	AMPLITUDE
1.	MECHANICAL ZERO	MECHANICAL ZERO
2.	240 μ sec	ELECTRICAL ZERO
3.	320 μ sec	CALIBRATE
4.	400 μ sec	

COUNTY RIO BLANCO

Per
Log
Dri

Dat
Run
Pip
Pip
Typ

Typ
S
D
L
Max
Ope
Rec
Wit

Bi
7 7

SWS

Schlumberger

ORIENTED PERFORATING RECORD AND CASING COLLAR LOG

COUNTY RIO BLANCO
FIELD or LOCATION SORGHUM GULCH
WELL S.G. NO.11
COMPANY ATLANTIC RICHFIEL COMPANY

COMPANY ATLANTIC RICHFIELD COMPANY

WELL S.G. NO.11

FIELD SORGHUM GULCH

COUNTY RIO BLANCO **STATE** COLORADO

Location:
12' NSL &
160' WEL
Sec. 7 Twp. 3S Rge. 96W

Other Services:
CBL-GR-
VDL-CCL

Permanent Datum: GROUND LEVEL ; Elev.: 6900
Log Measured From GL , 0 Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B. ----
D.F. ----
G.L. 6900

Date	9/25/74
Run No.	ONE
Pipe String No.	1-2-3
Pipe String Ident.	LONG-MIDDLE-SHORT
Type Orienting	POWERED
Type fluid in hole	WATER
Salinity, PPM Cl.	----
Density	----
Level	FULL
Max rec. temp., deg F.	----
Operating rig time	
Recorded by	ST. AUBYN
Witnessed by	MR. ELLARD

BORE-HOLE RECORD			CEMENTING RECORD				
Bit	From	To		Type	Wgt.	From	To
7 7/8	60	2819	Primary				
			Squeeze				

SWS-1521-A

FOLD HERE

The well name, location and borehole reference data were furnished by the customer.

EQUIPMENT DATA

Hoist Truck No.	3862	Rotator Size	1 11/16
Inst. Truck No.	3862	Rotator No.	
Tool Serial No.		Indexer Type	
Location	VERNAL	Indexer No.	

DEPTHS RELATE TO

Radioactivity Measurements ☒
Schlumberger Line Measurements ☐

CASING COLLARS

PERFORATING DATA / LOGGING DATA

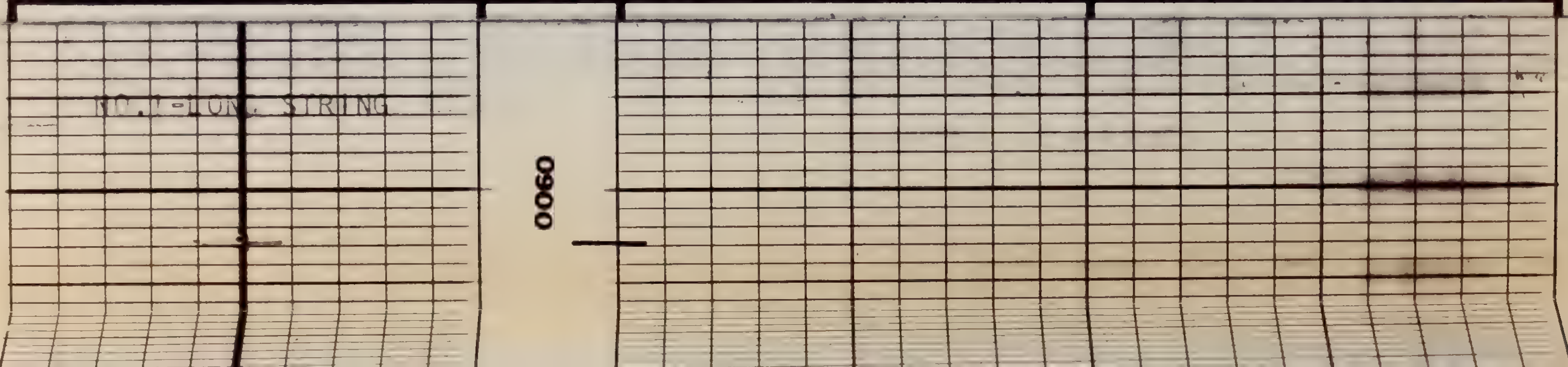
Depths From	Depths To	No. Shots	Gun Size	Gun Type	Time Const.	Sens. Setting	Zero Shift	Calib. Sens.	Calib. Defl.
[illegible]						S			

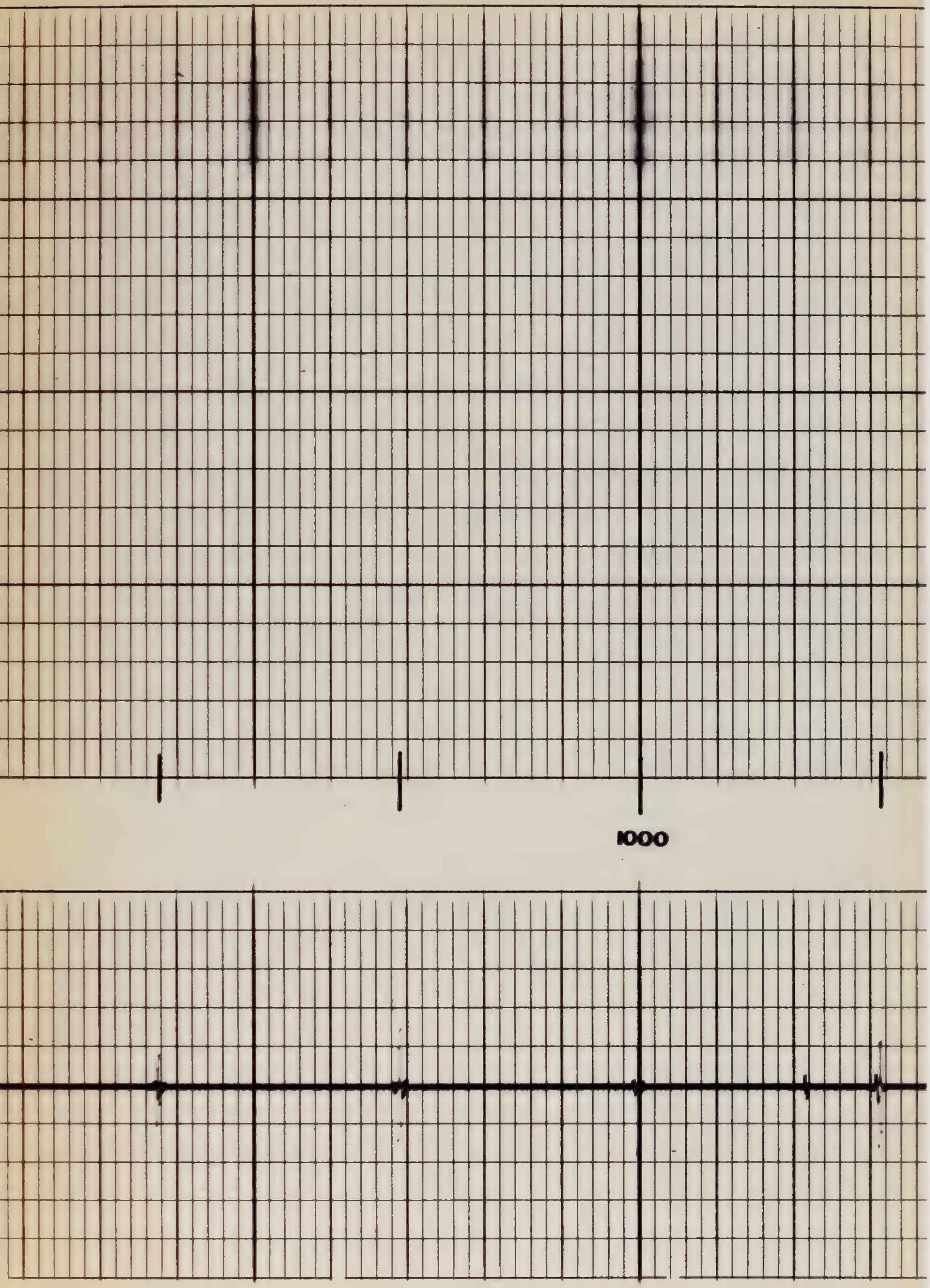
PIPE STRING RECORD

Number	1	2	3	4
Identific't'n	LONG	MIDDLE	SHORT	
Size	2 3/8	2 3/8	2 3/8	
Weight	4.7	4.7	4.7	
Depth	2820	1511	1323	

Remarks:

CASING COLLAR LOG BEFORE PERFORATION	DEPTHS		

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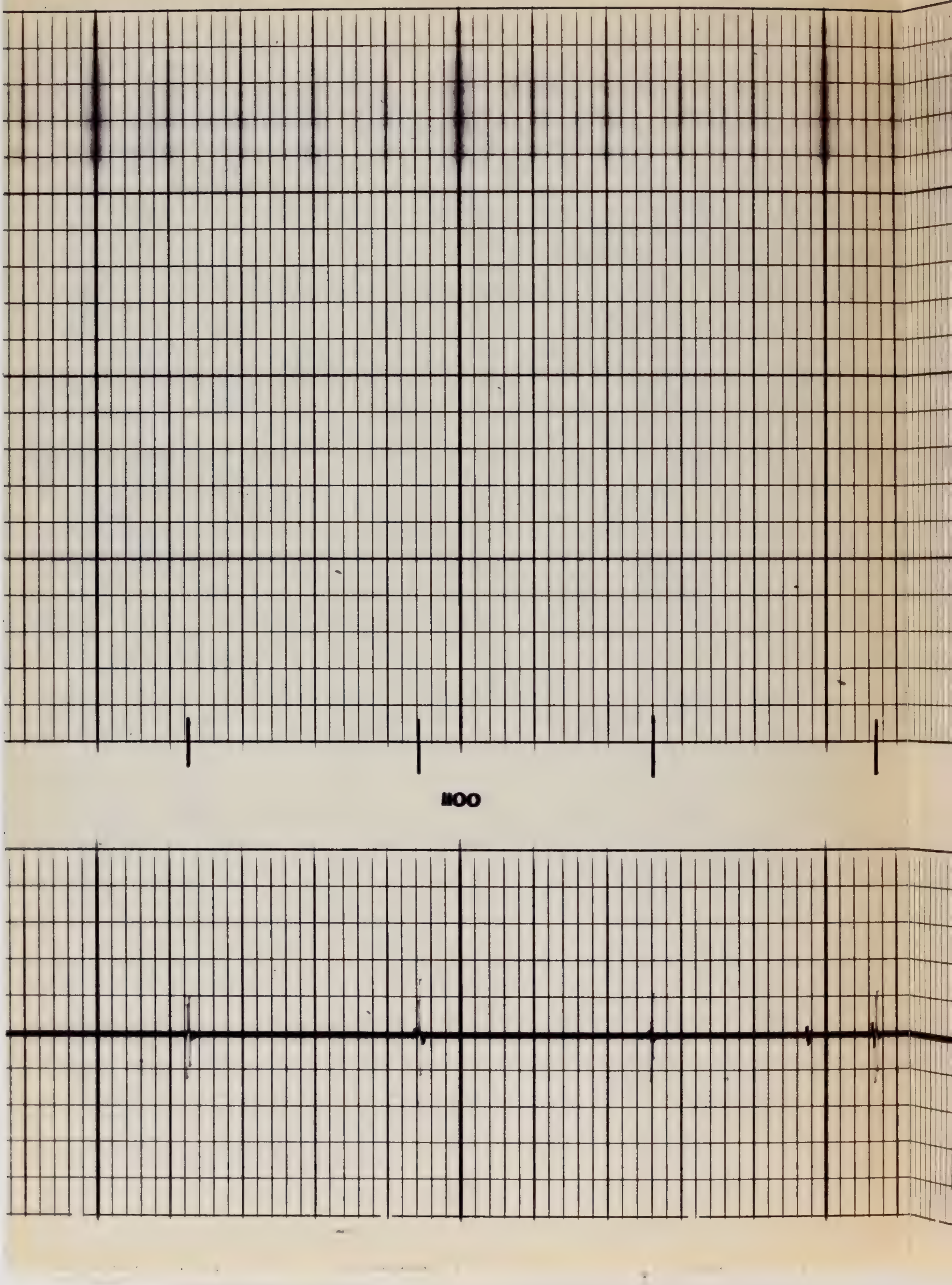
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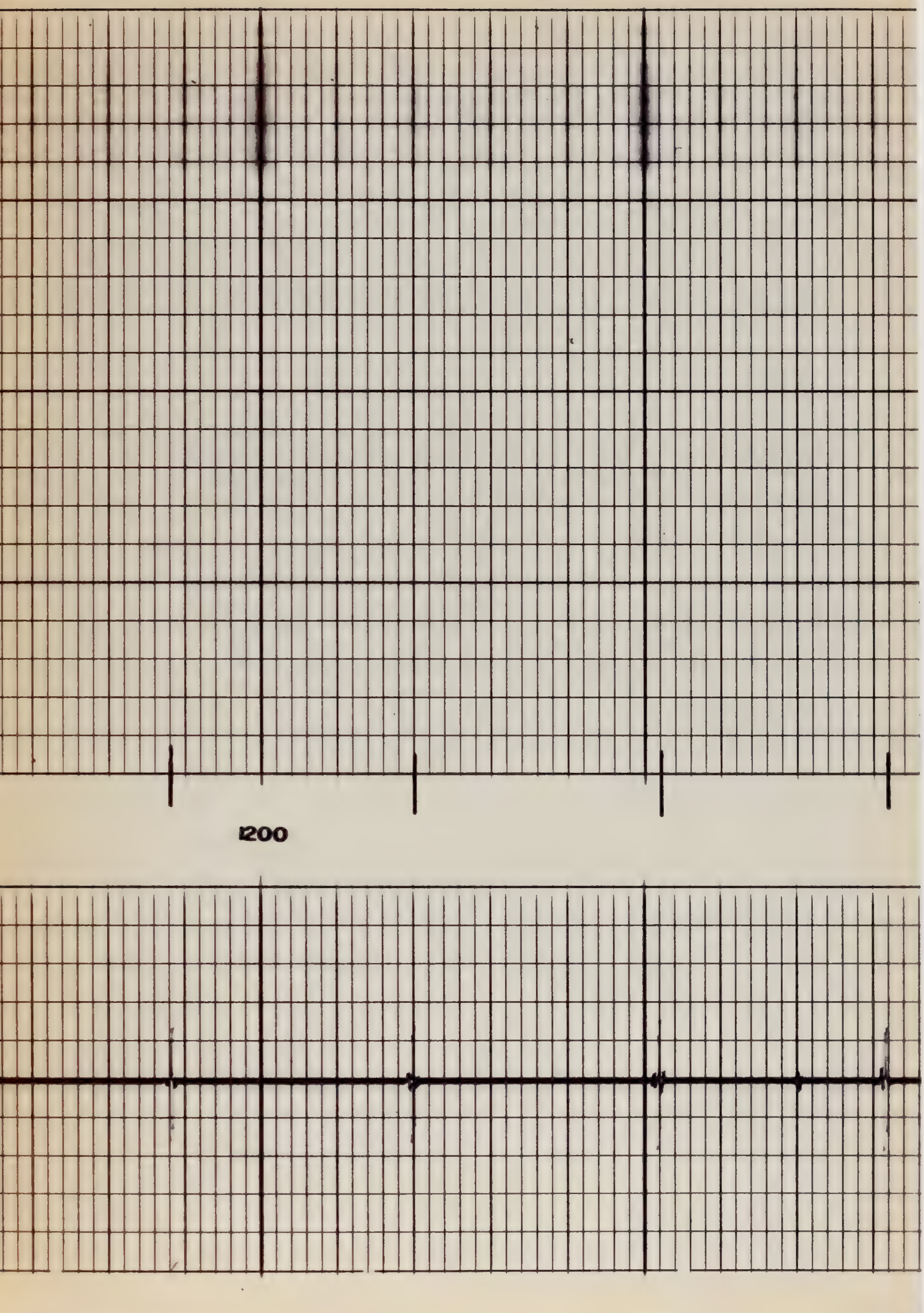
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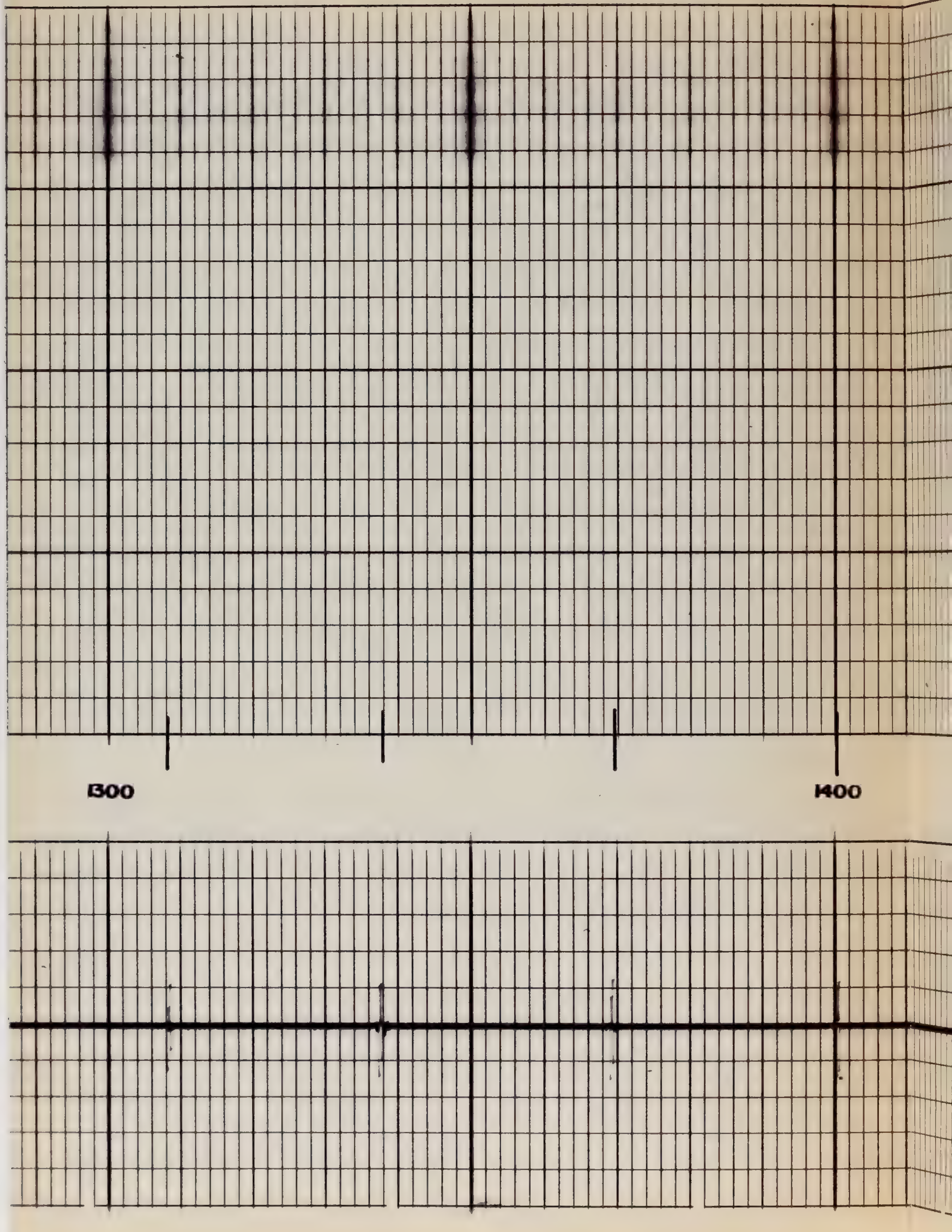
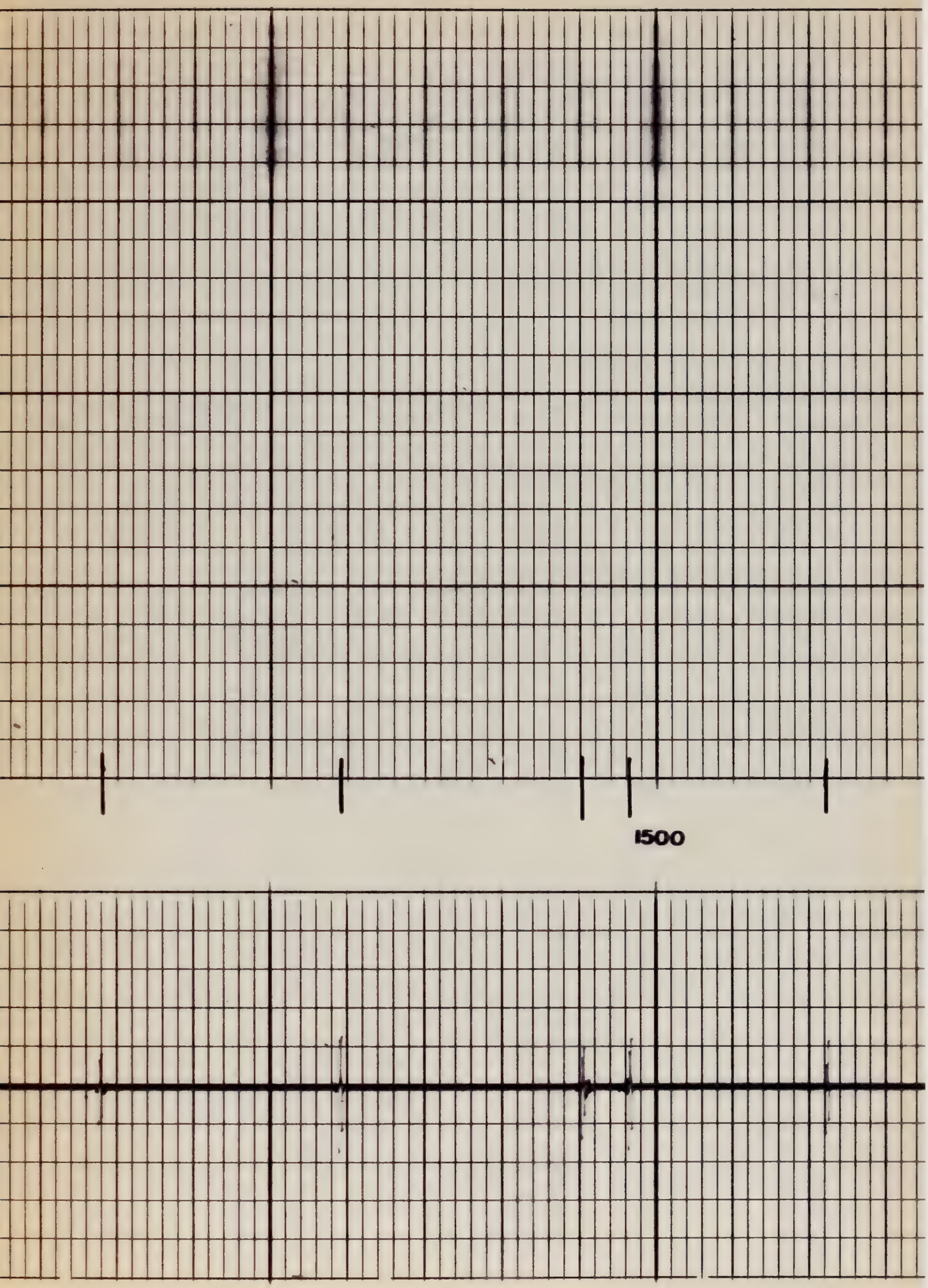

1300
1400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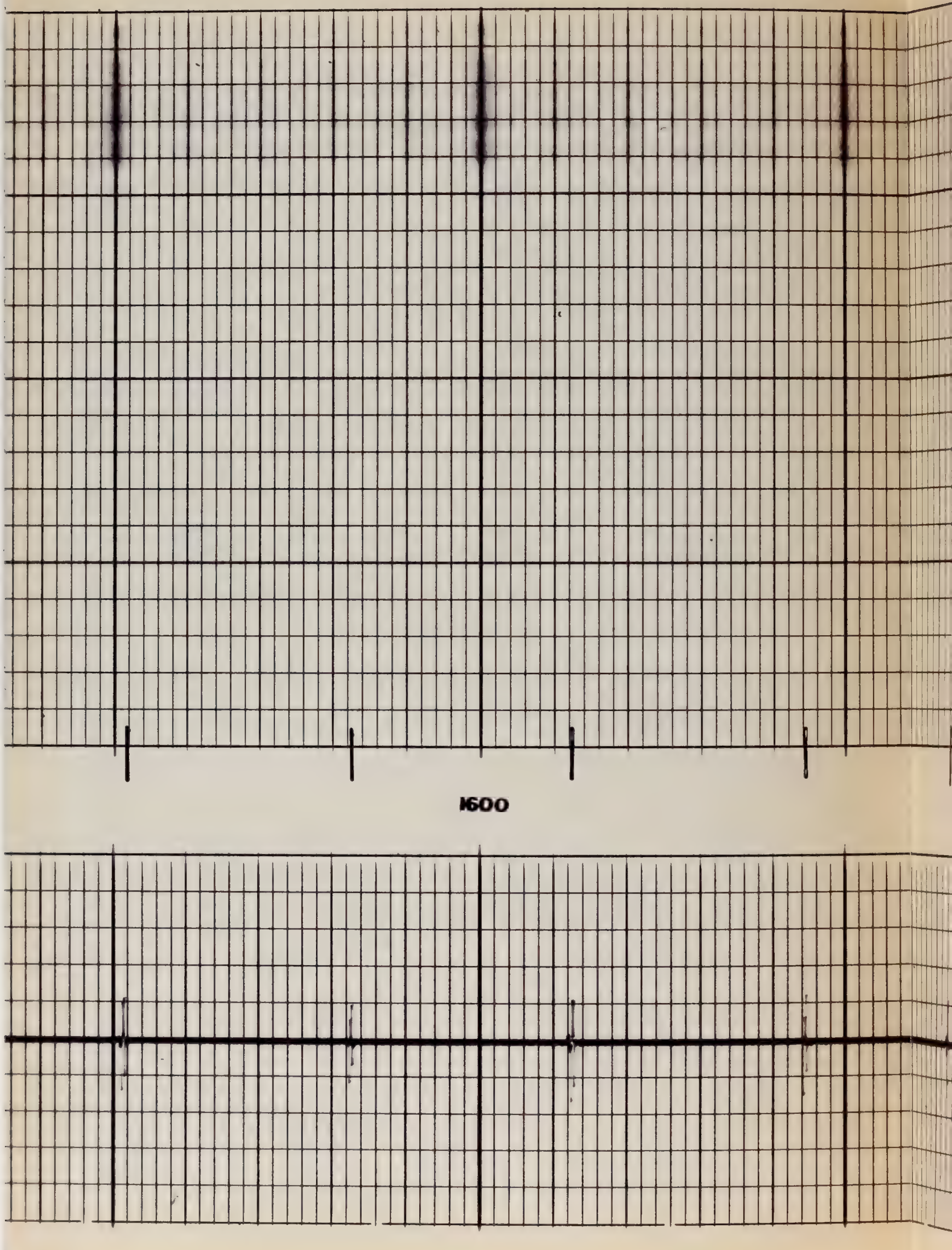
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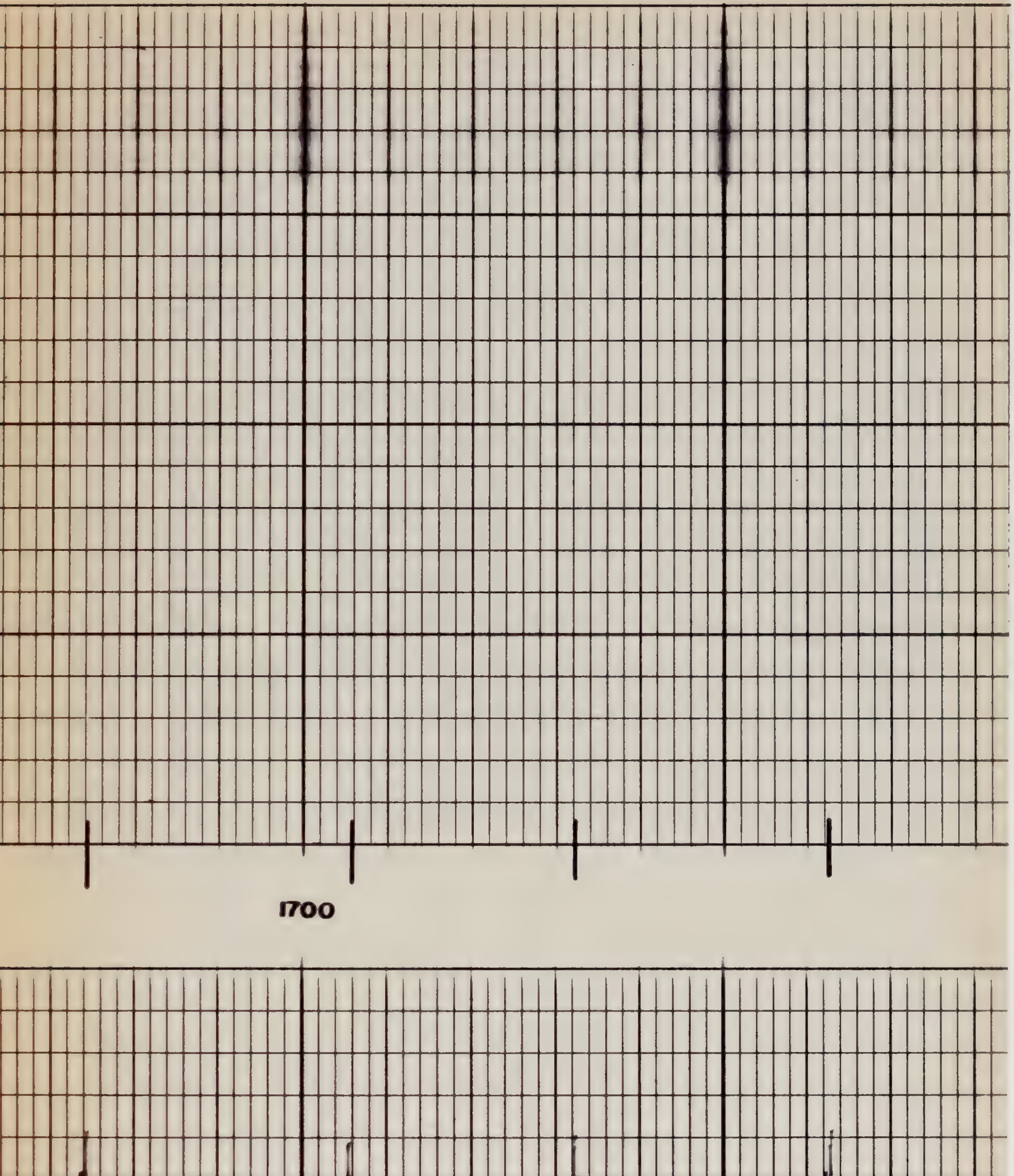
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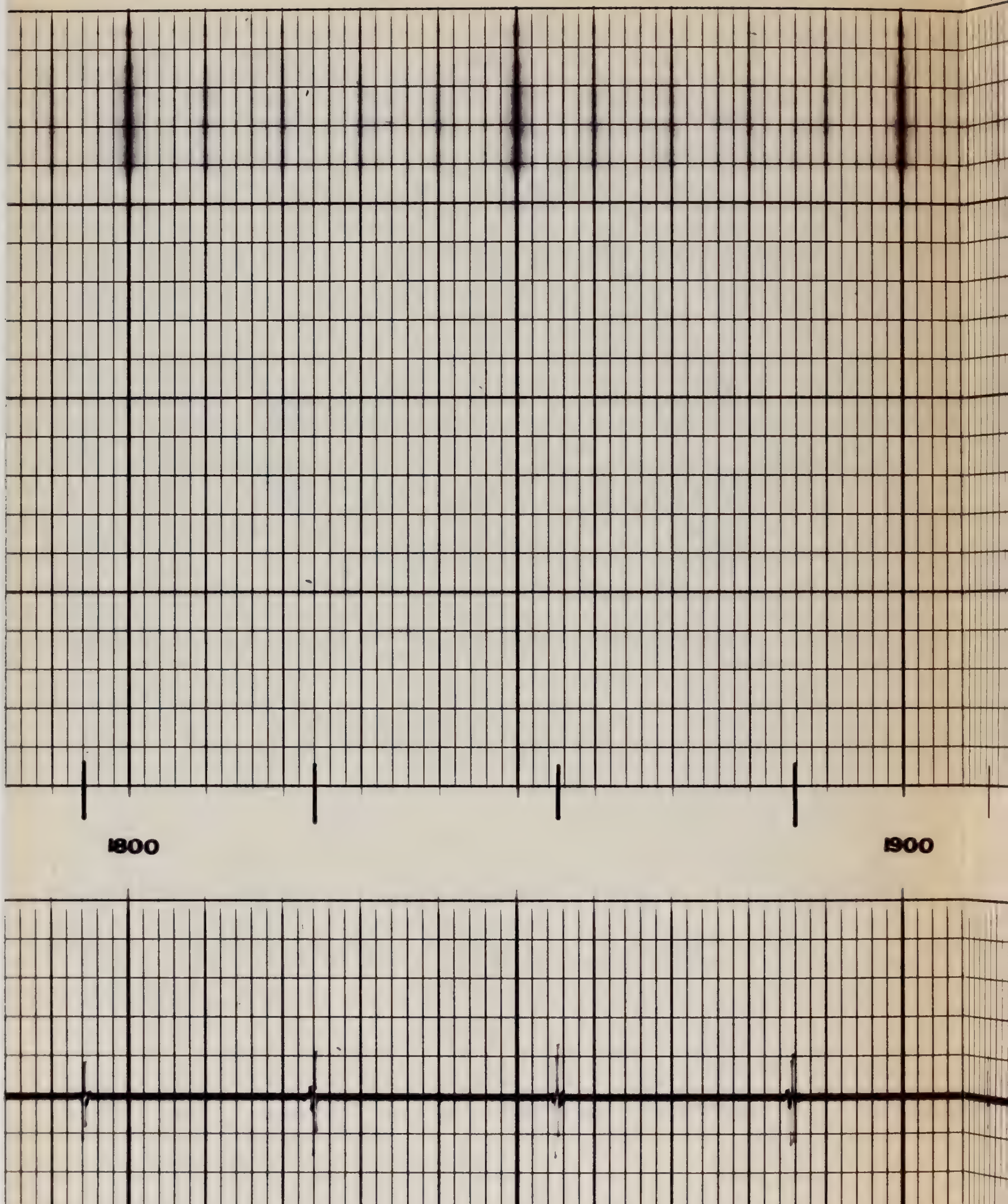
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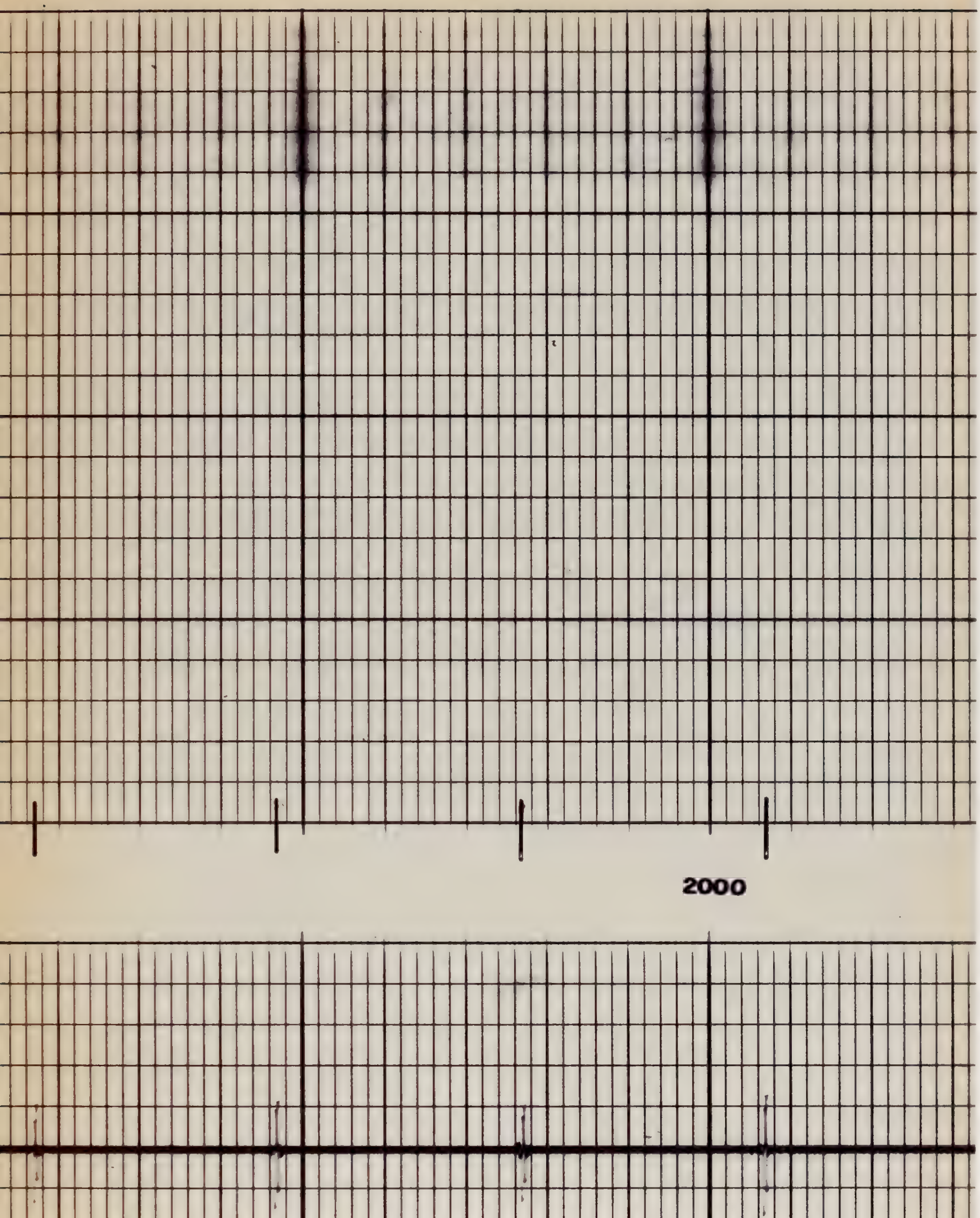
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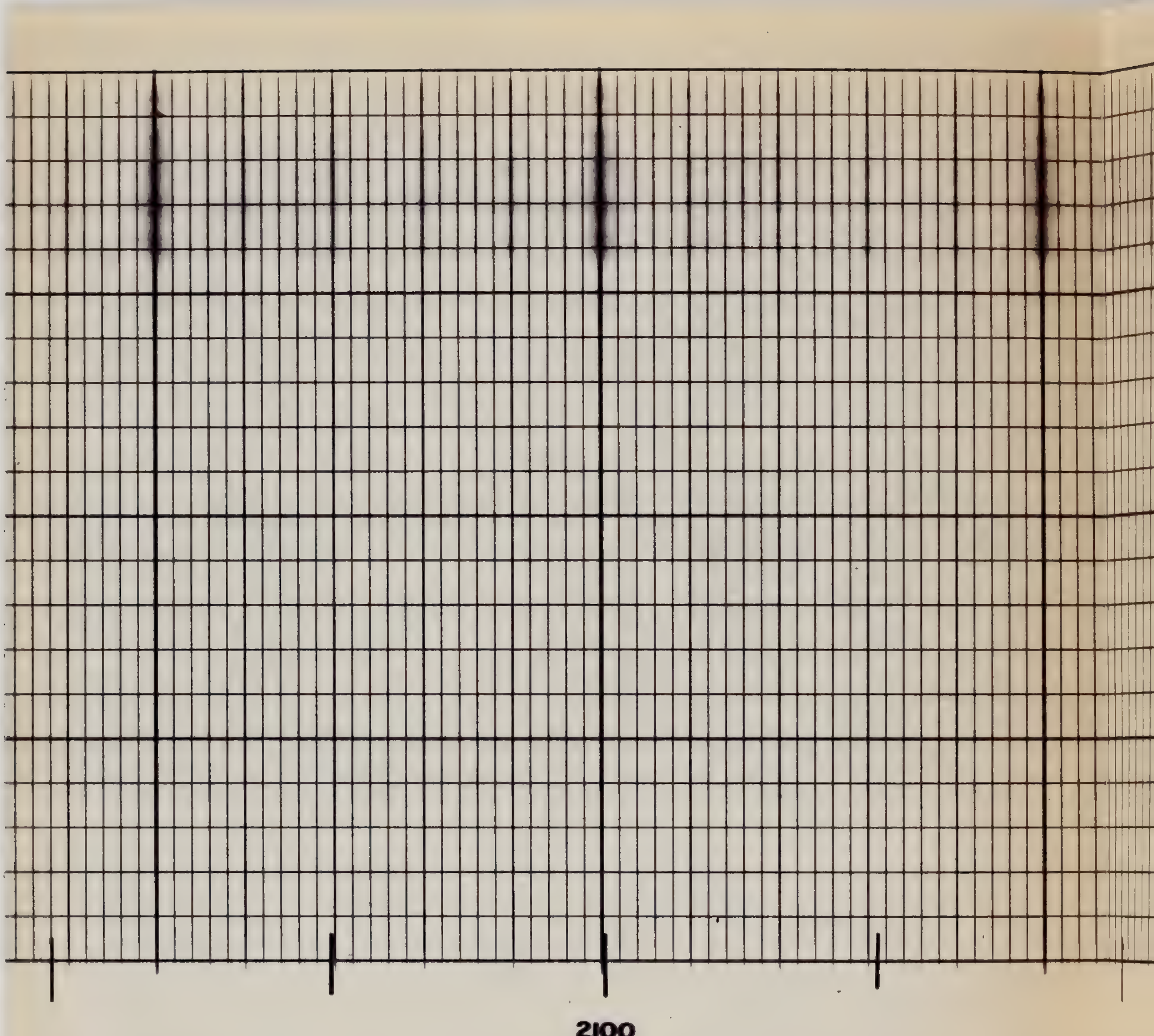
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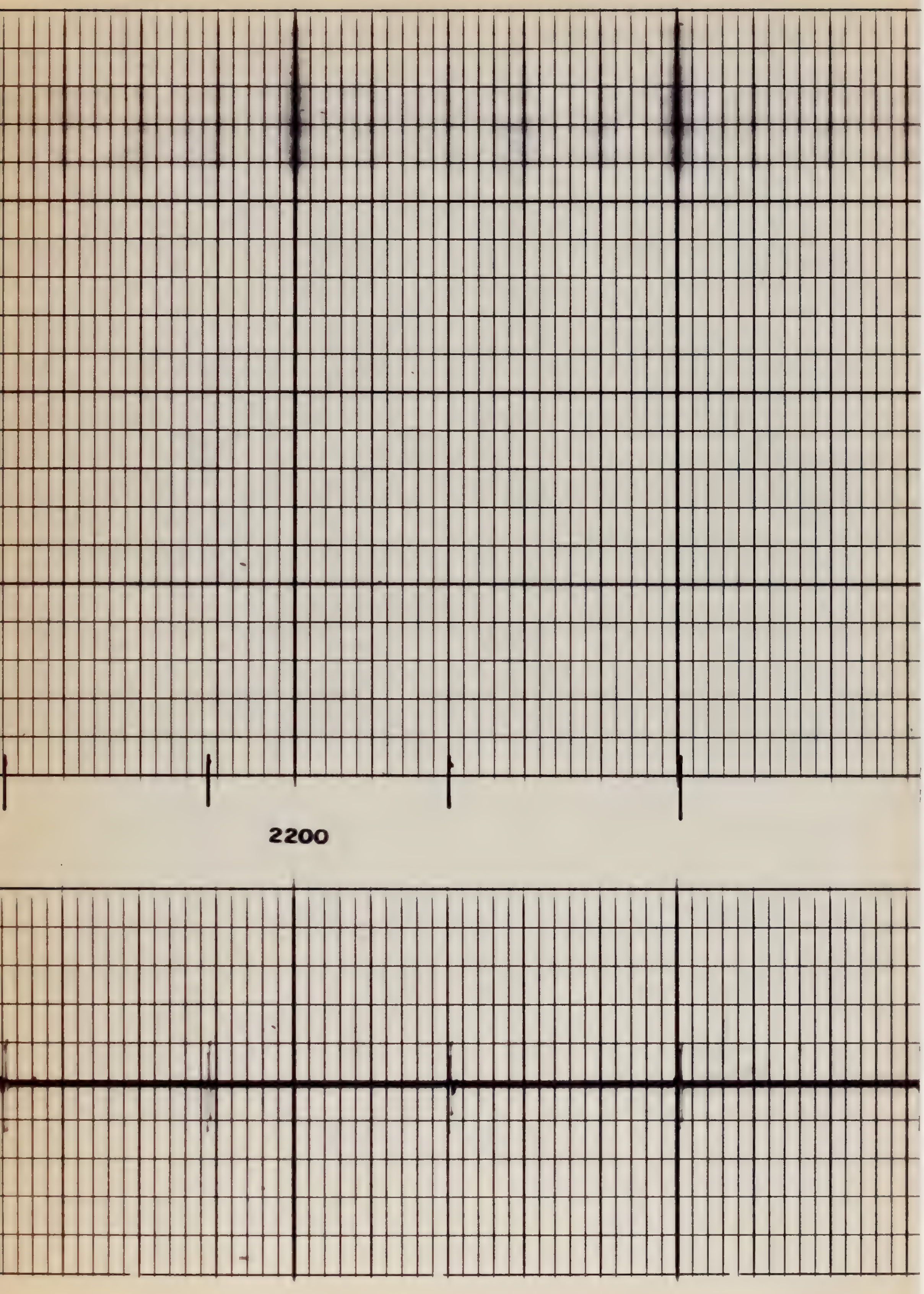
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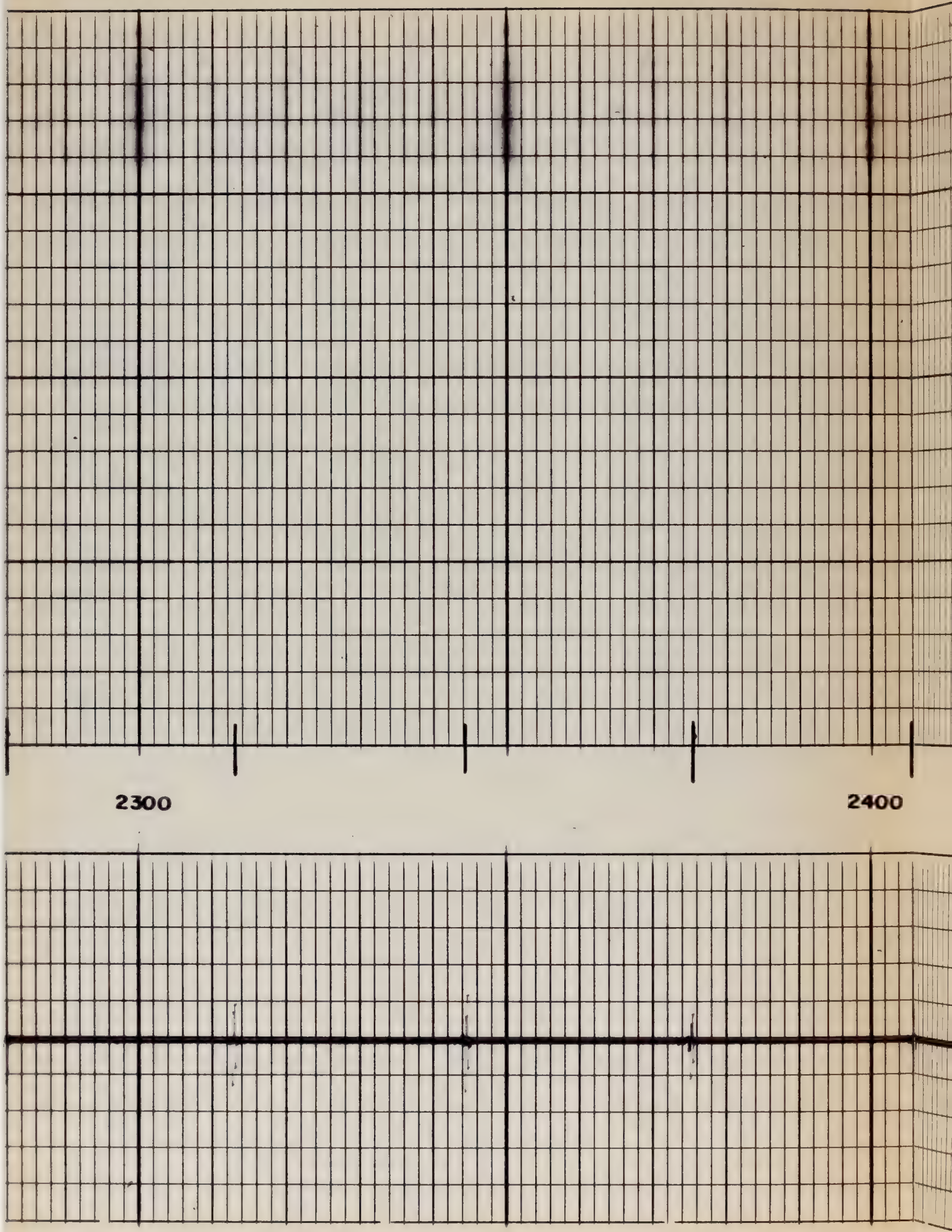
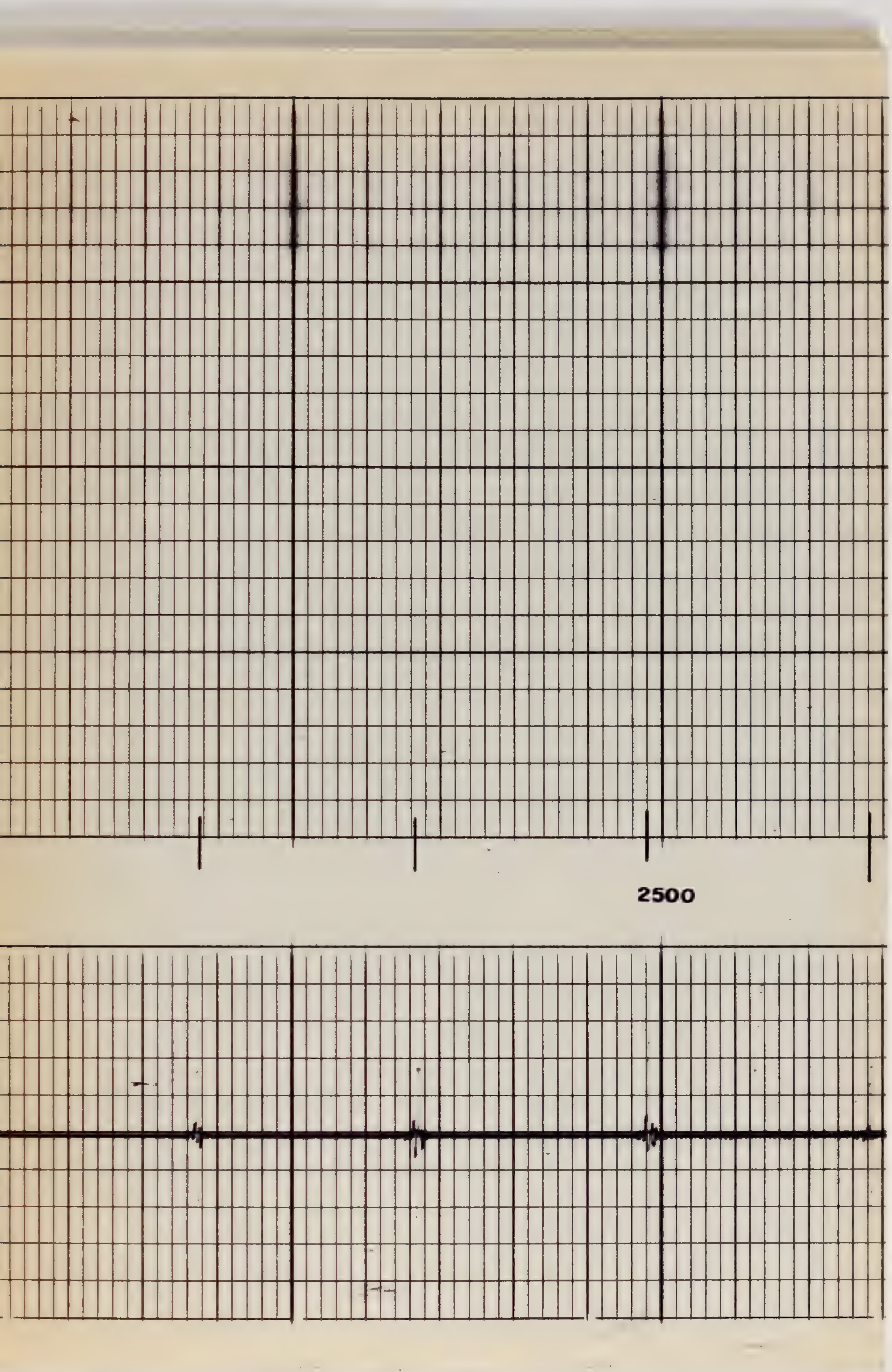

2300
2400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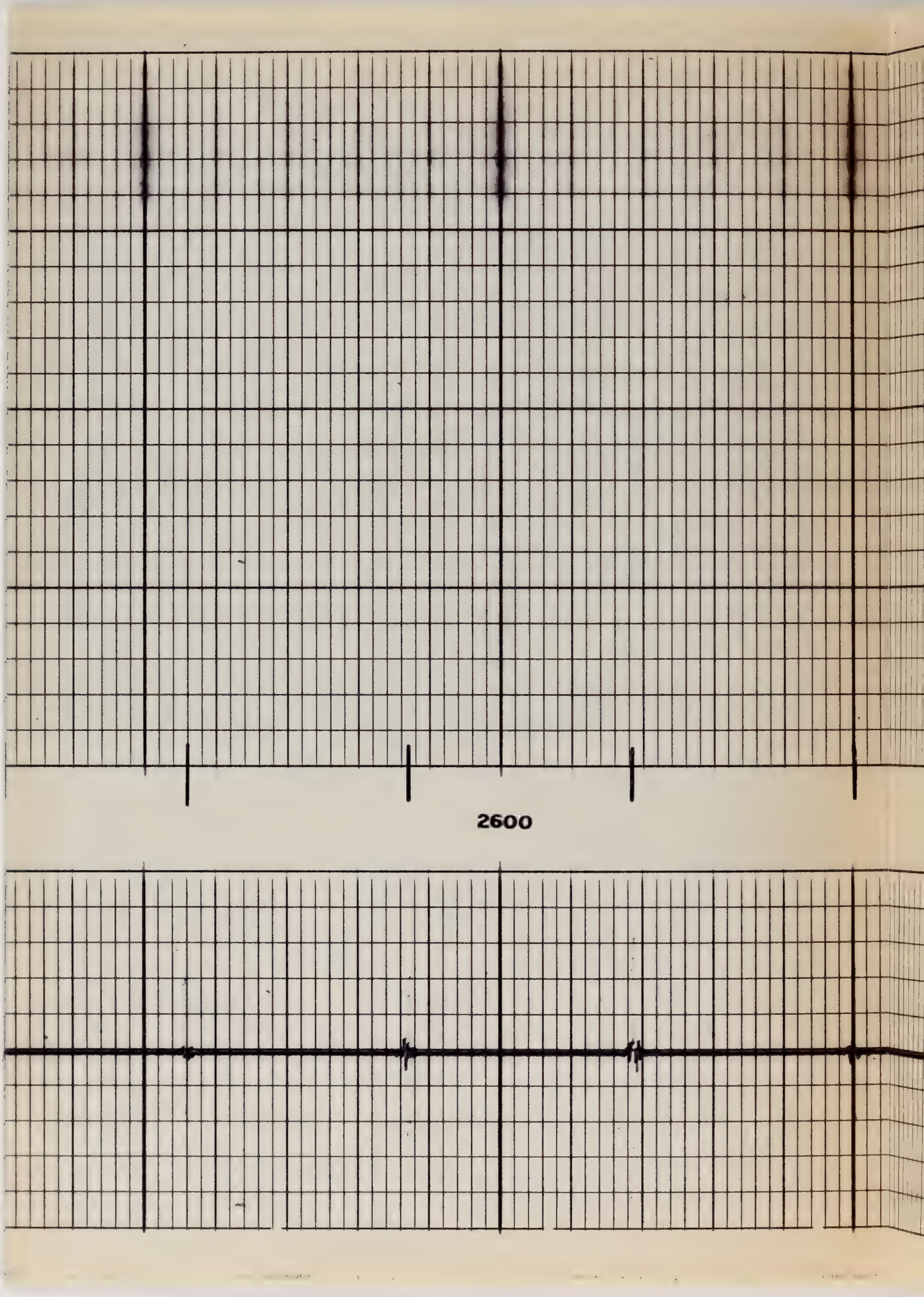
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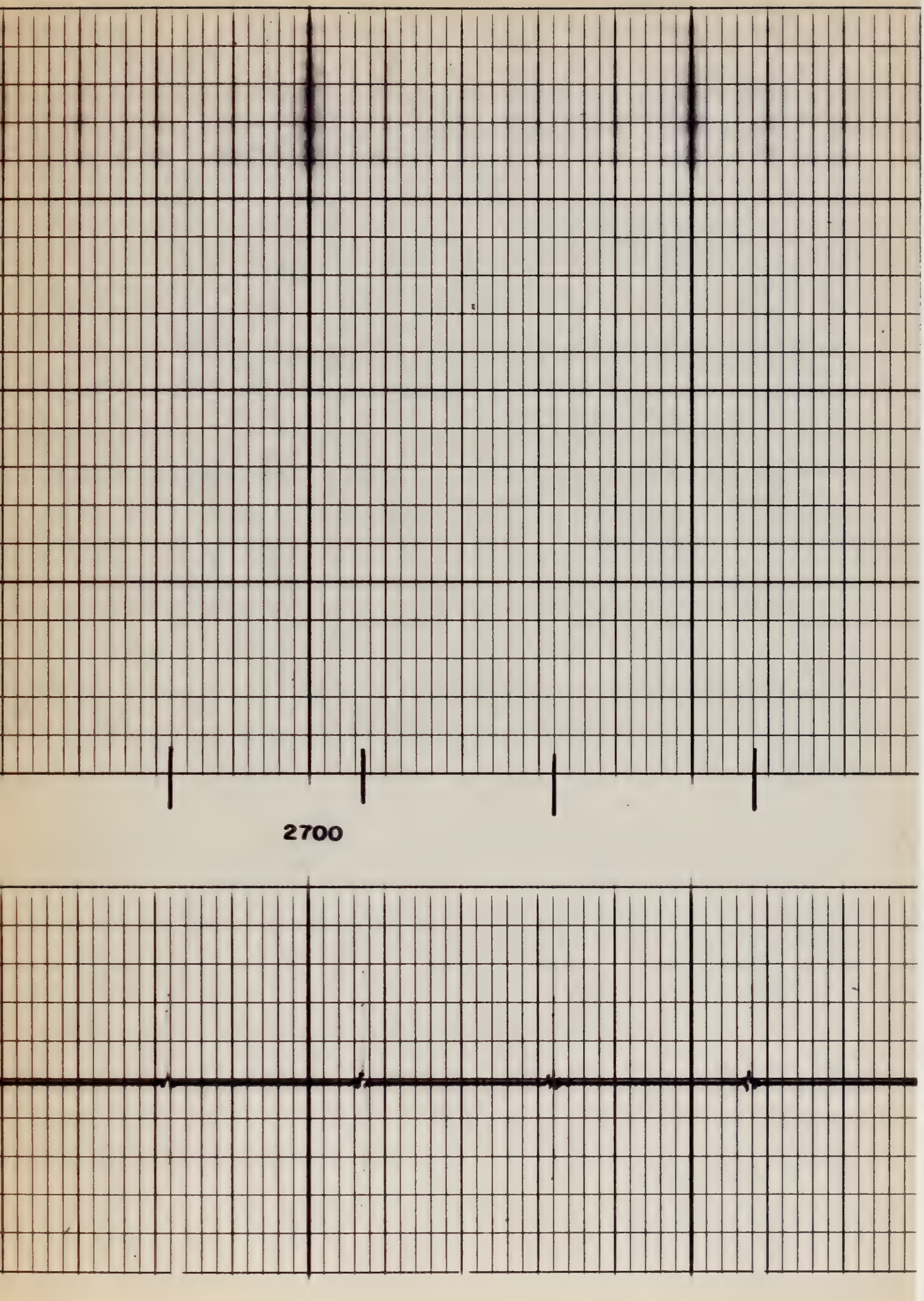
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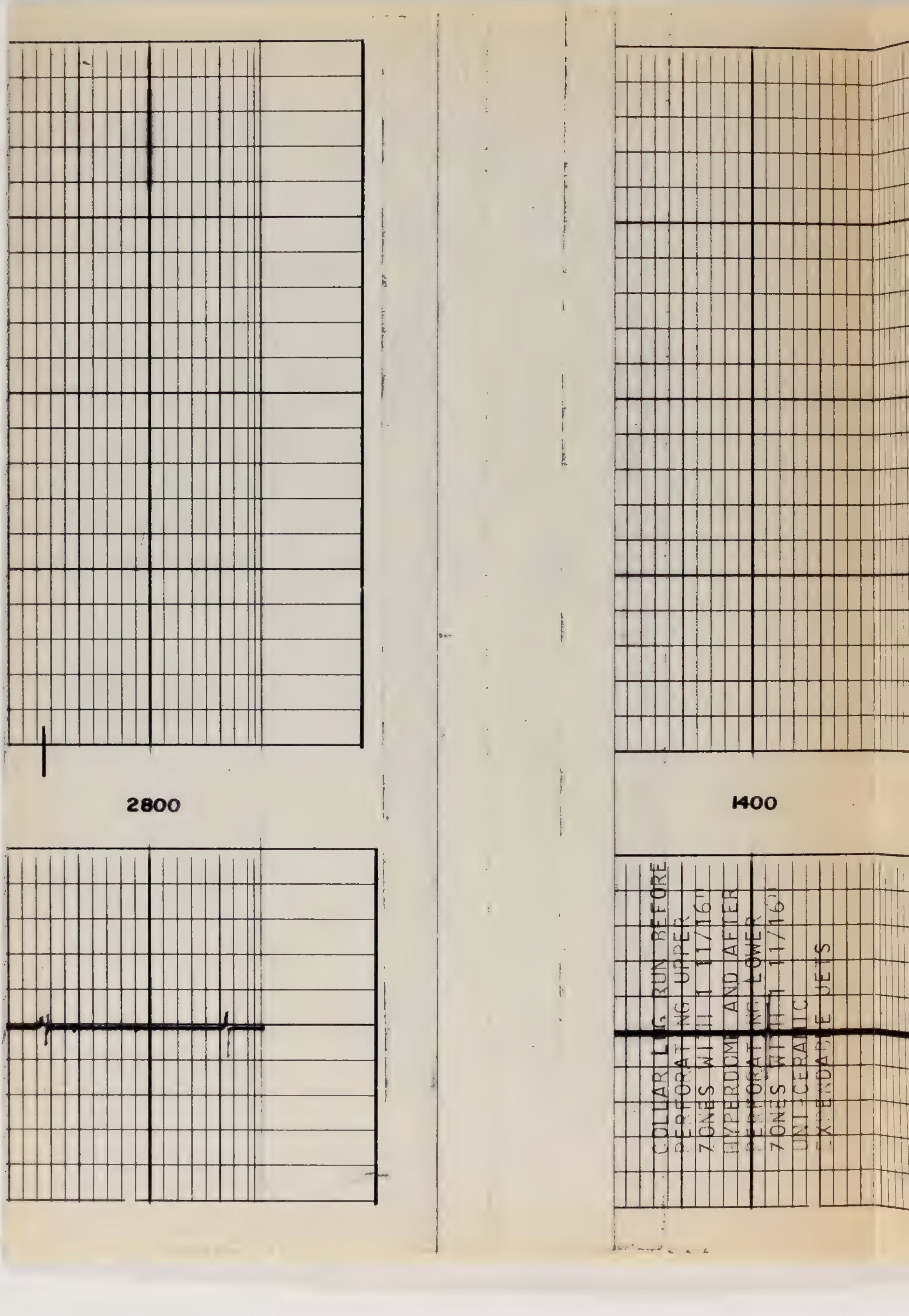
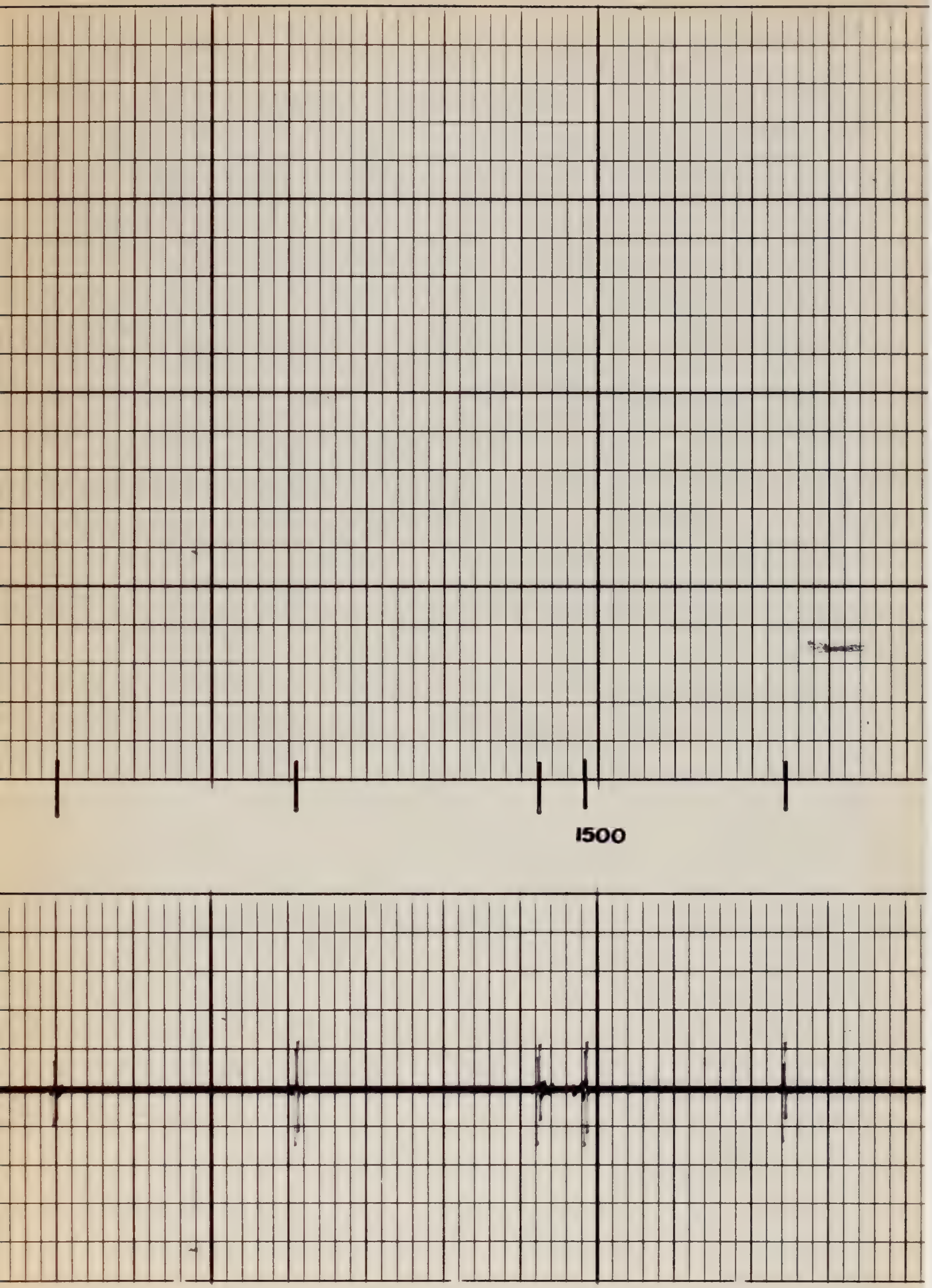

2800
1400
COLLAR LOG RUN BEFORE
PERFORATING UPPER
ZONES WITH 1 11/16"
HYPERDOME AND AFTER
PERFORATING LOWER
ZONES WITH 1 11/16"
UNI-CERAMIC
EXPENDABLE JETS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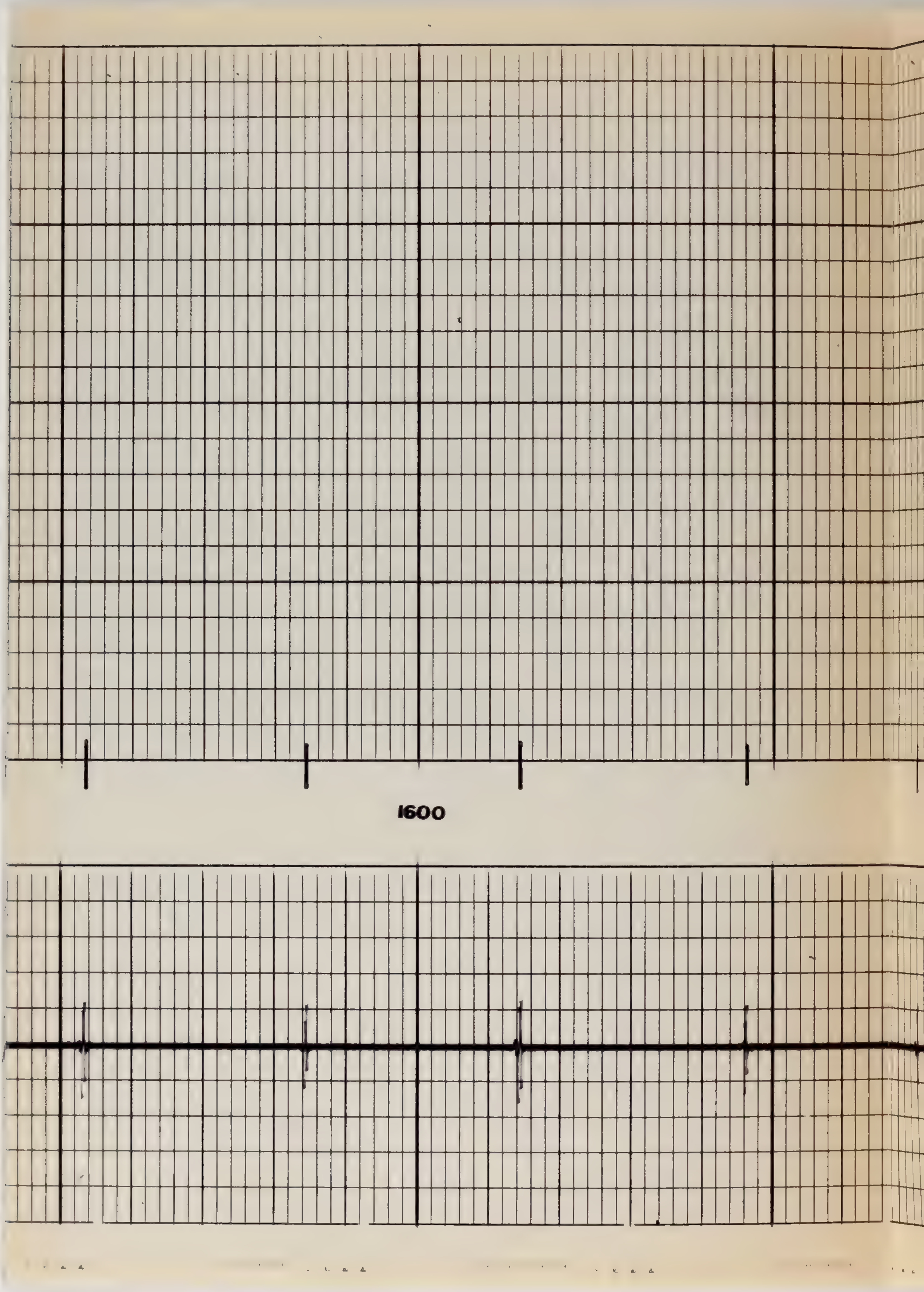
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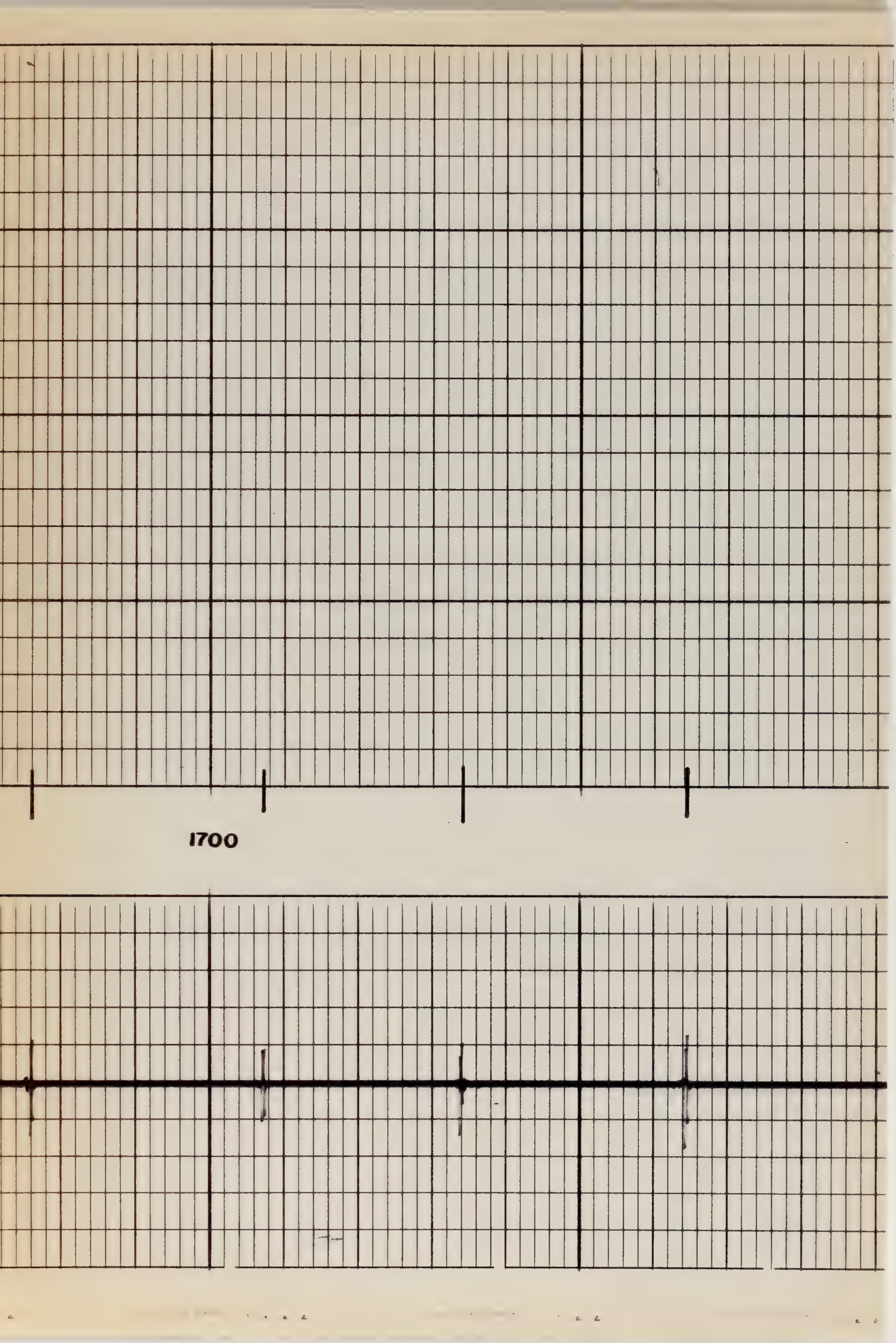

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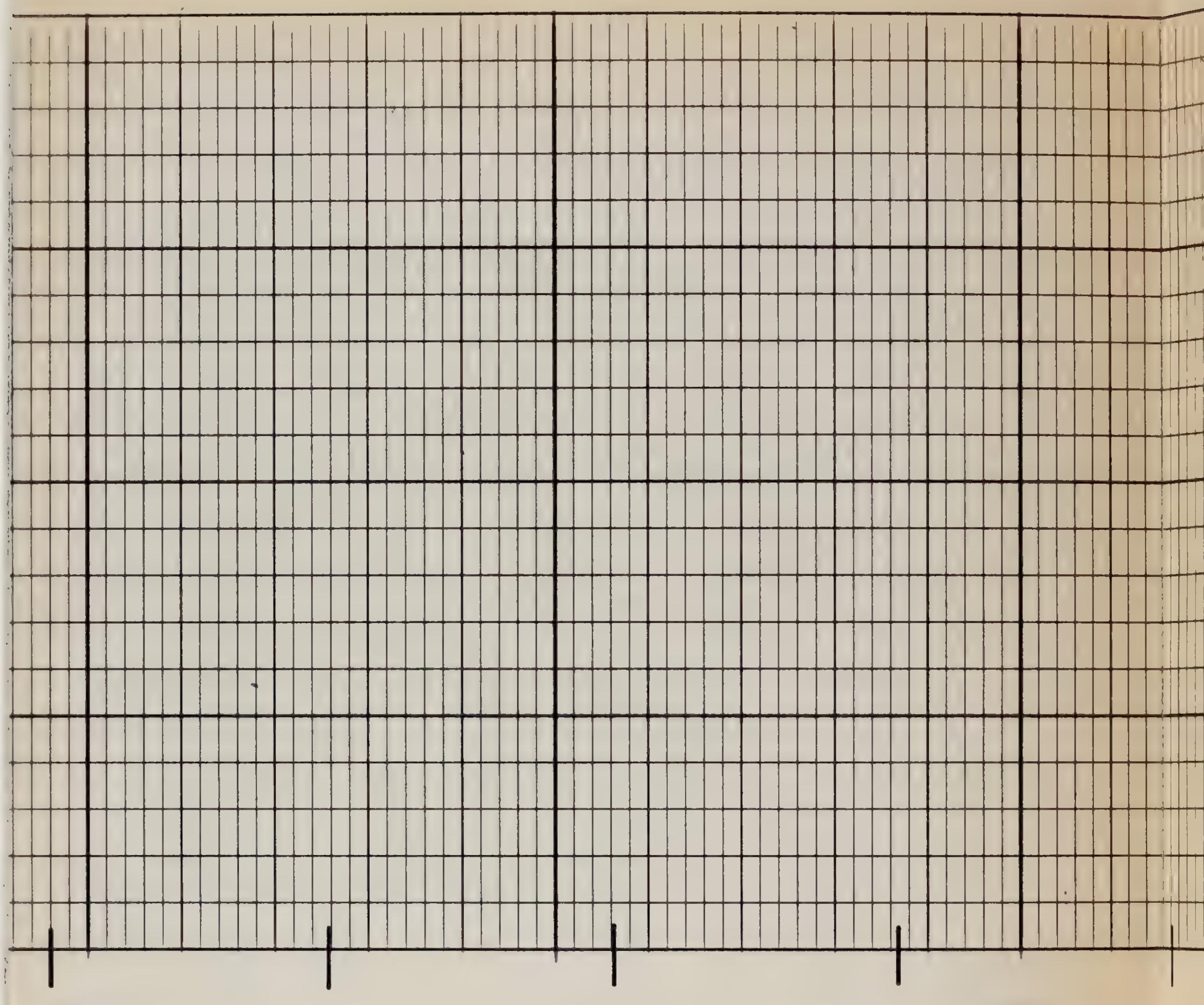
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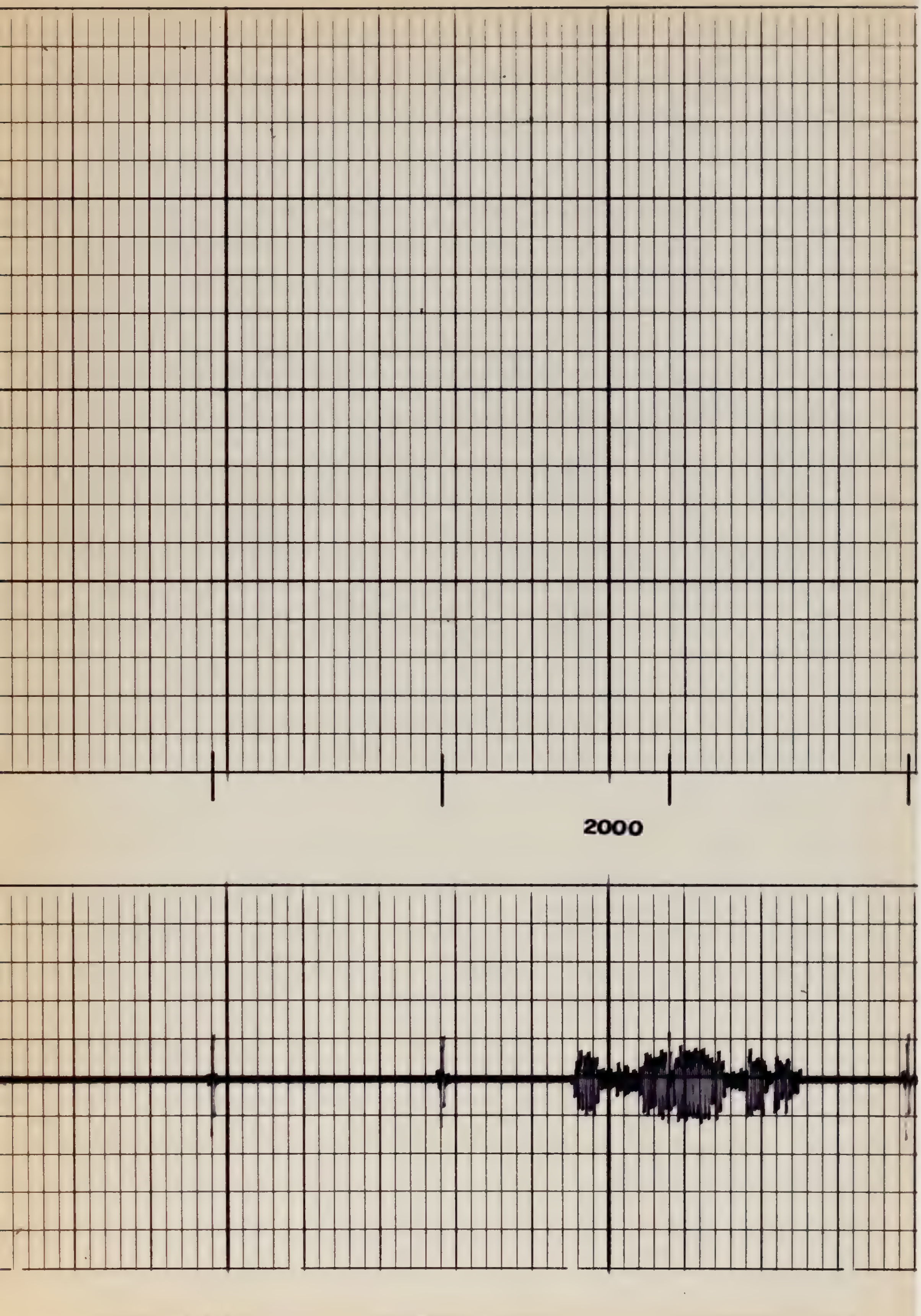
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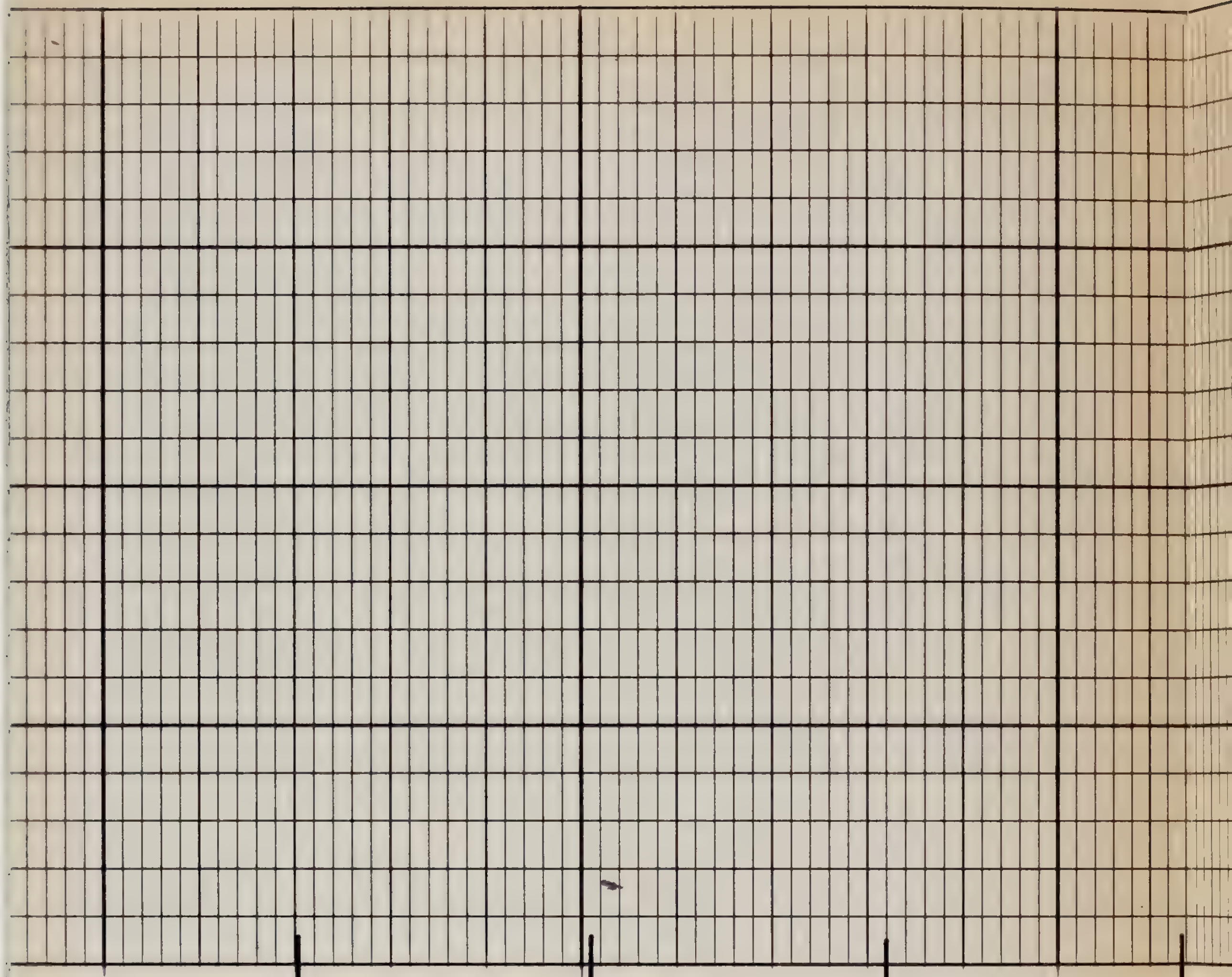
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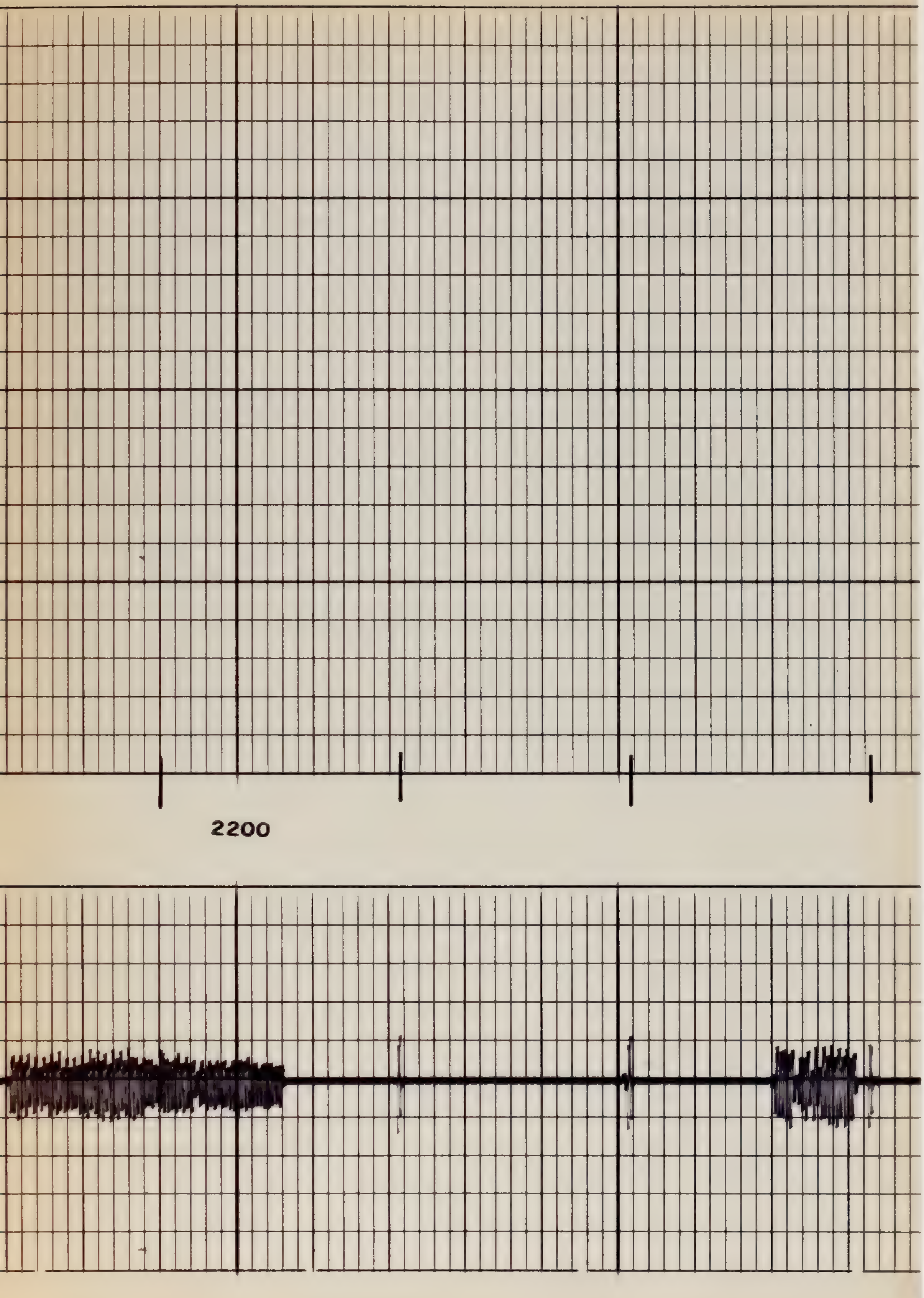
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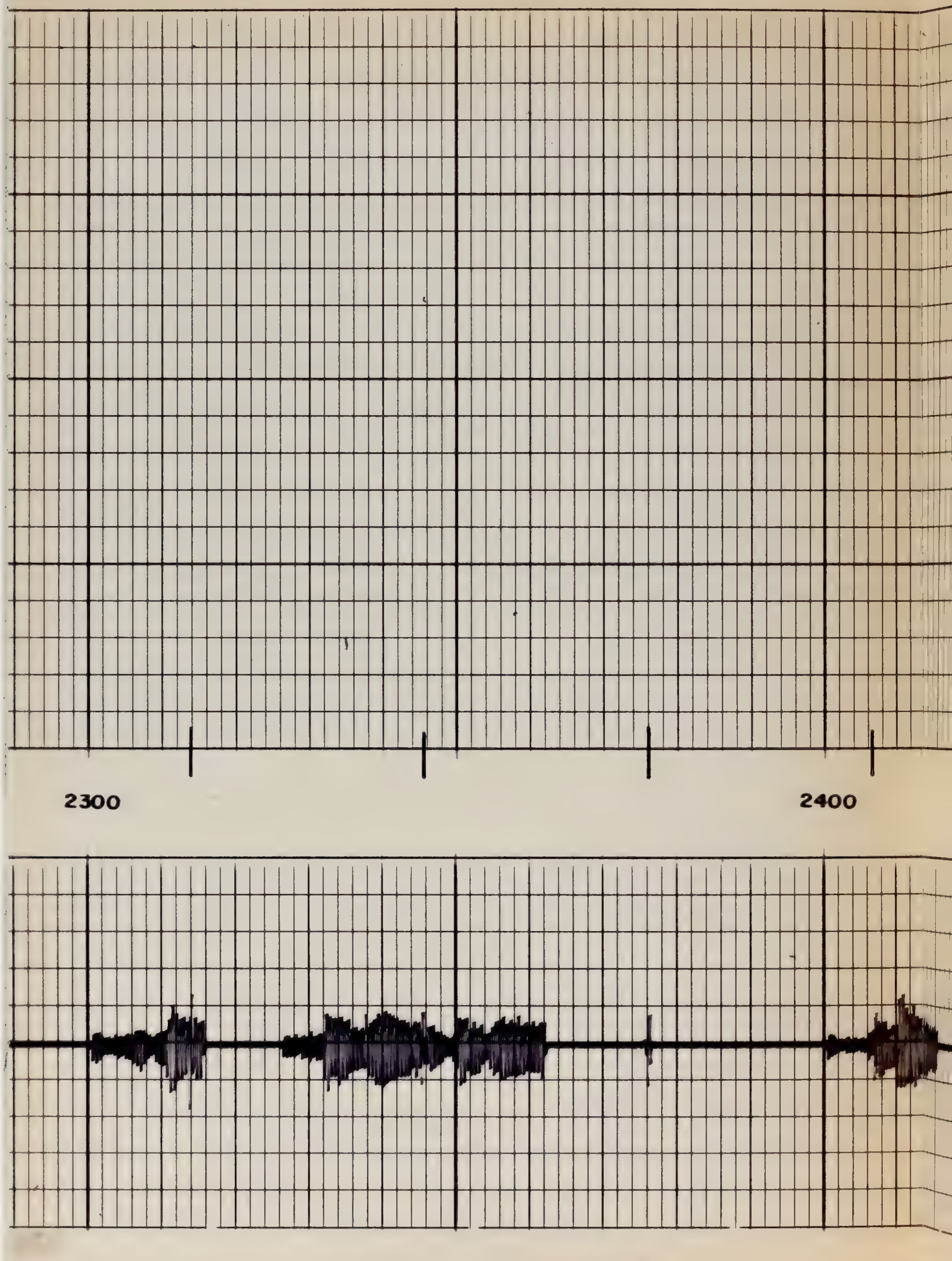
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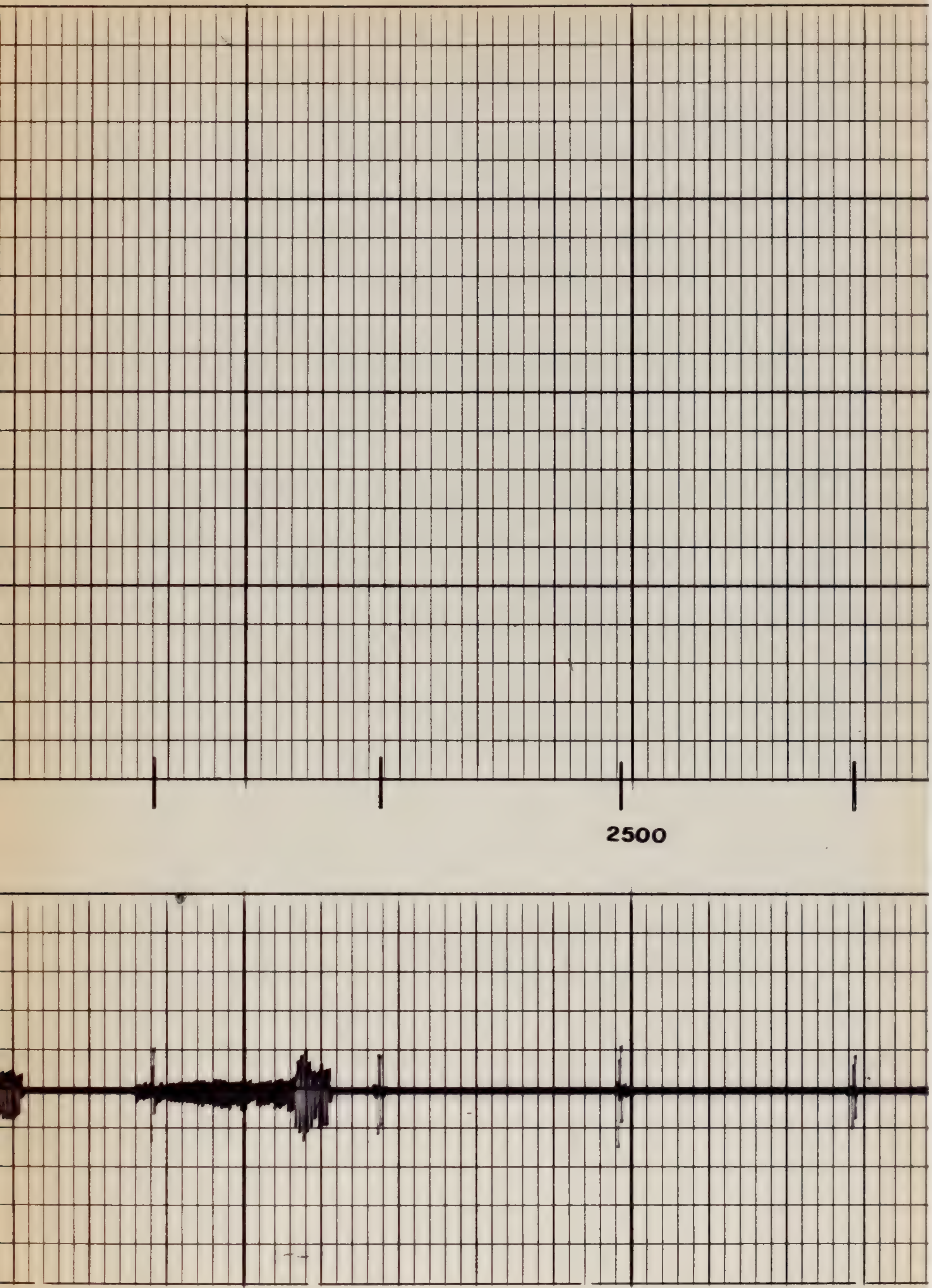
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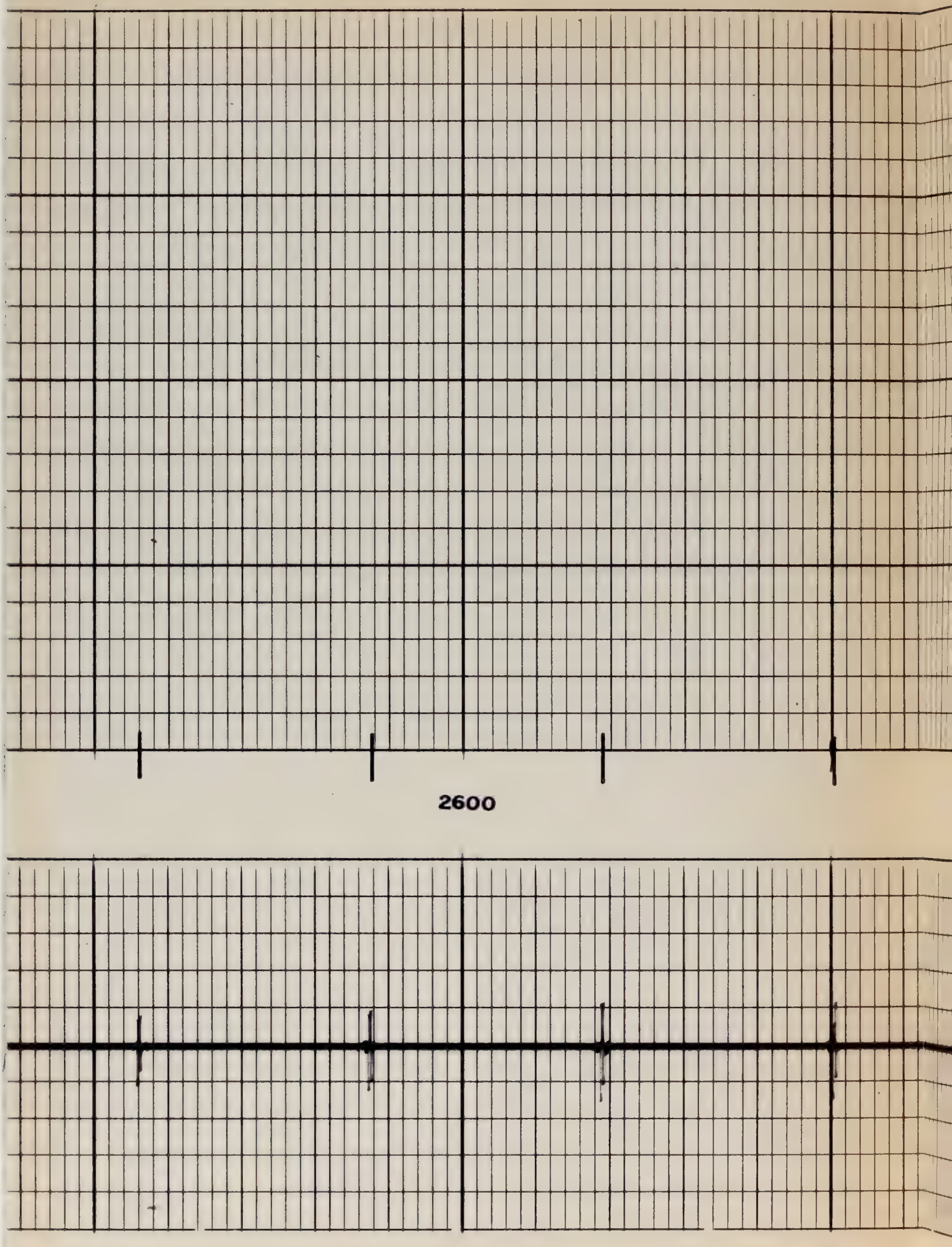
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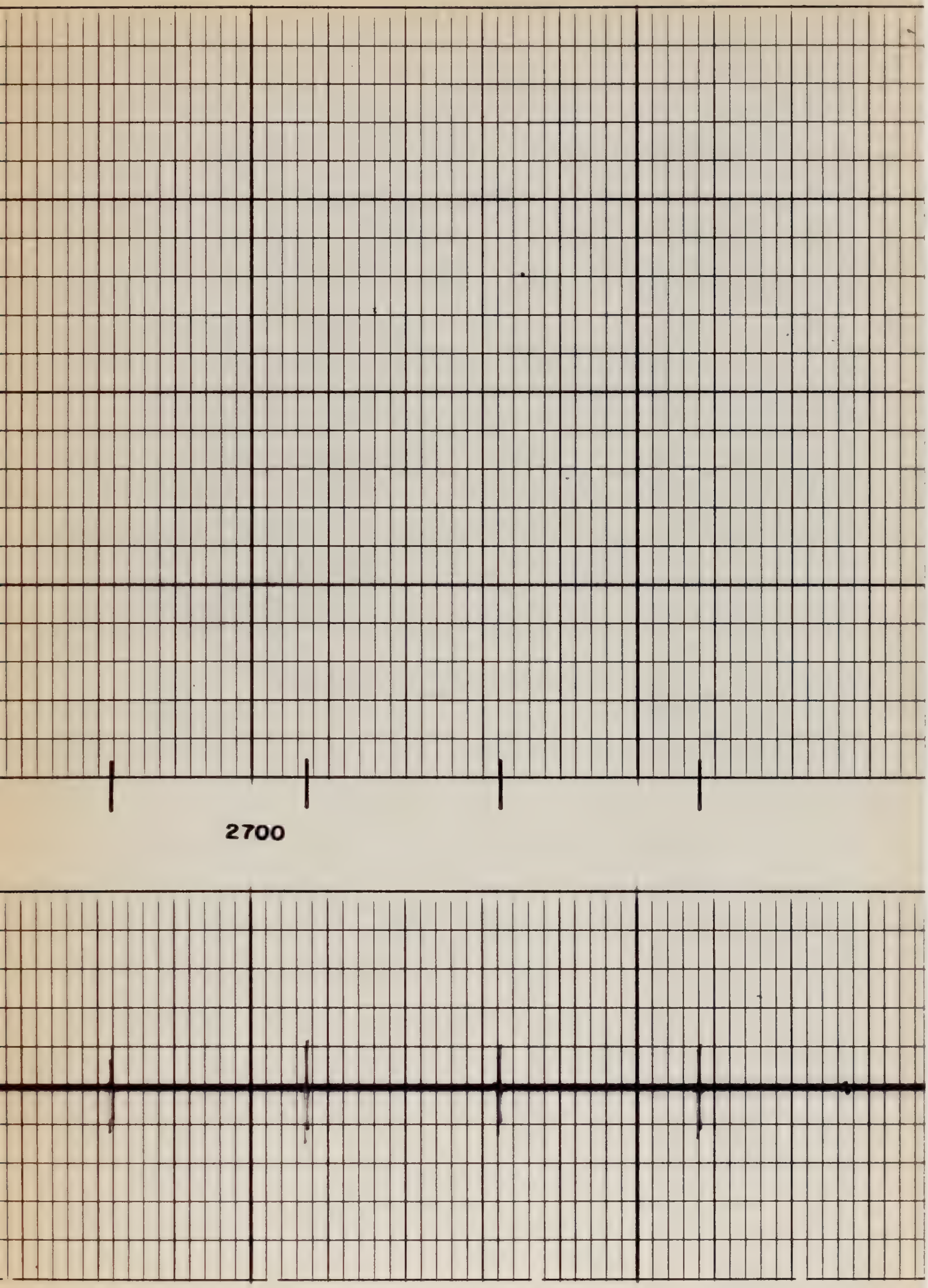
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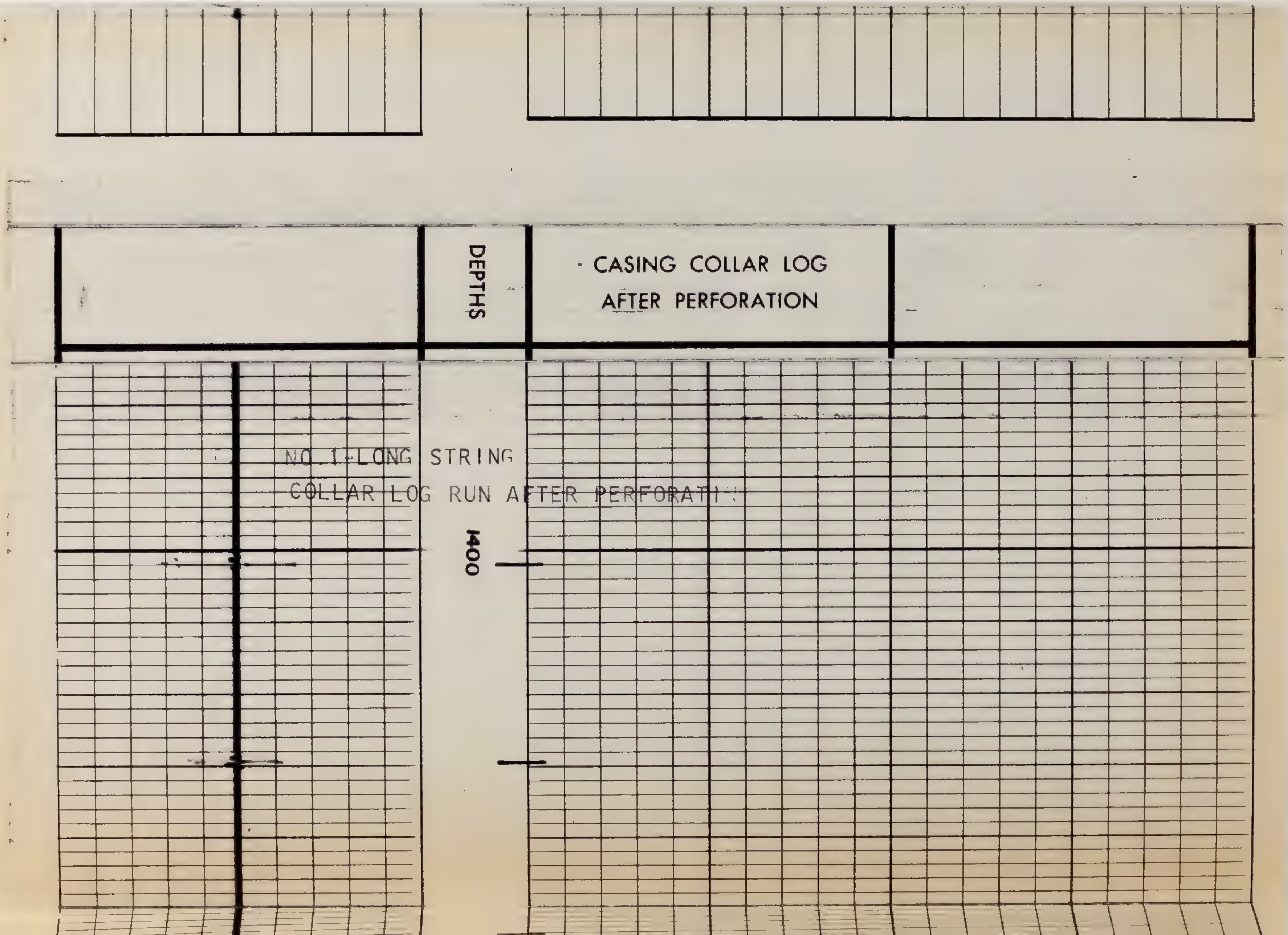
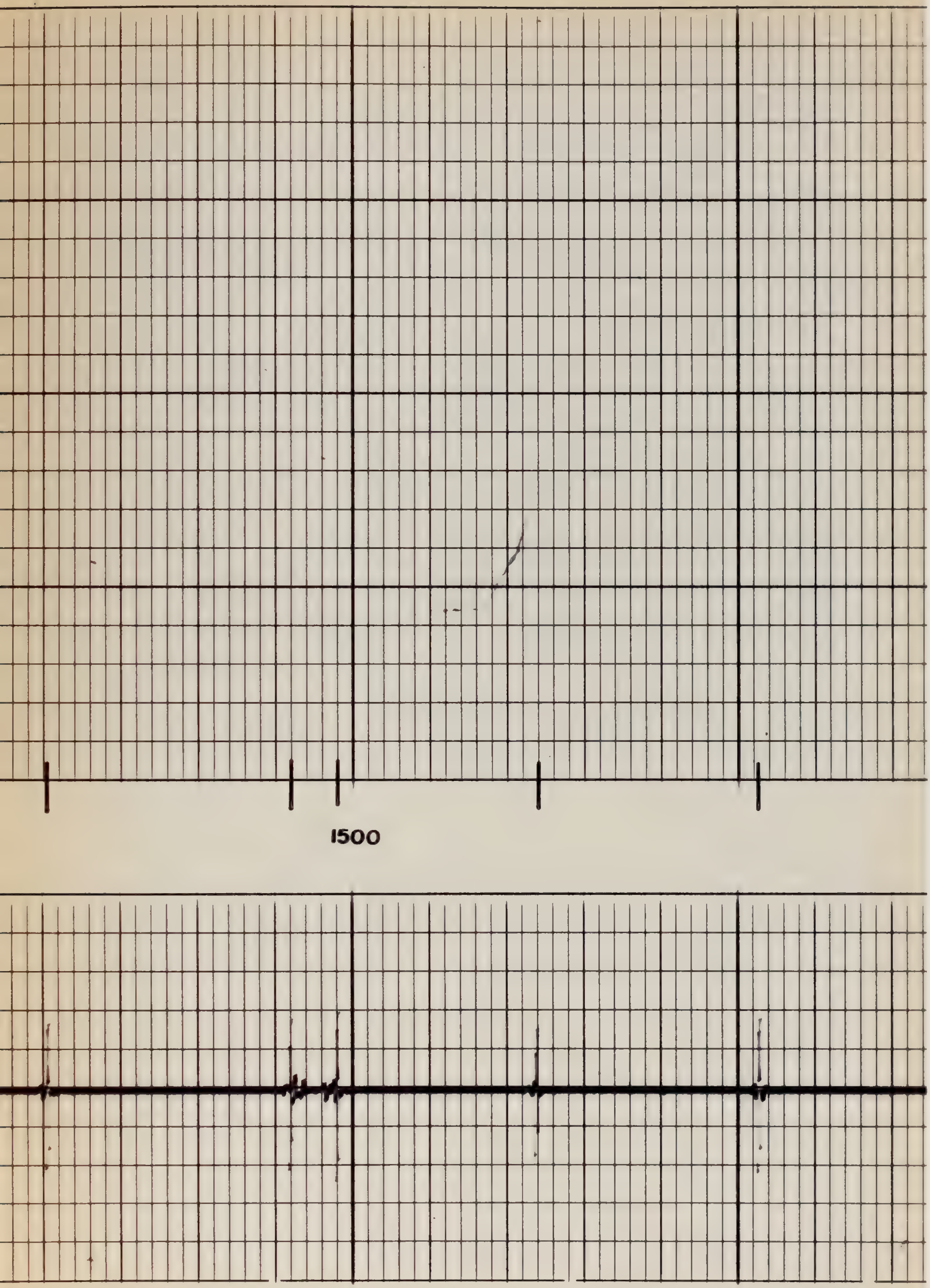

DEPTHS
· CASING COLLAR LOG
AFTER PERFORATION
NO.1-LONG STRING
COLLAR LOG RUN AFTER PERFORATI
1400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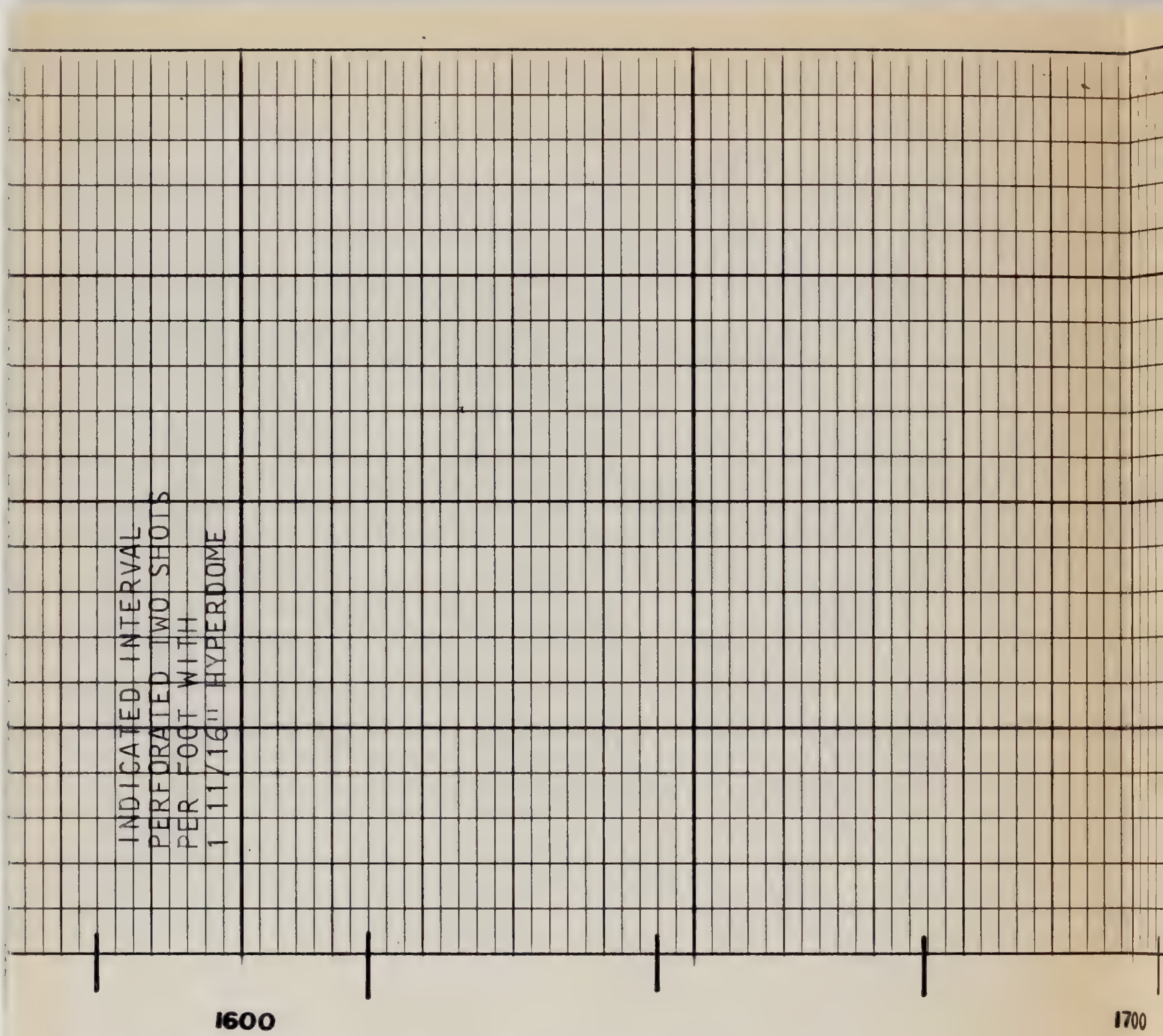
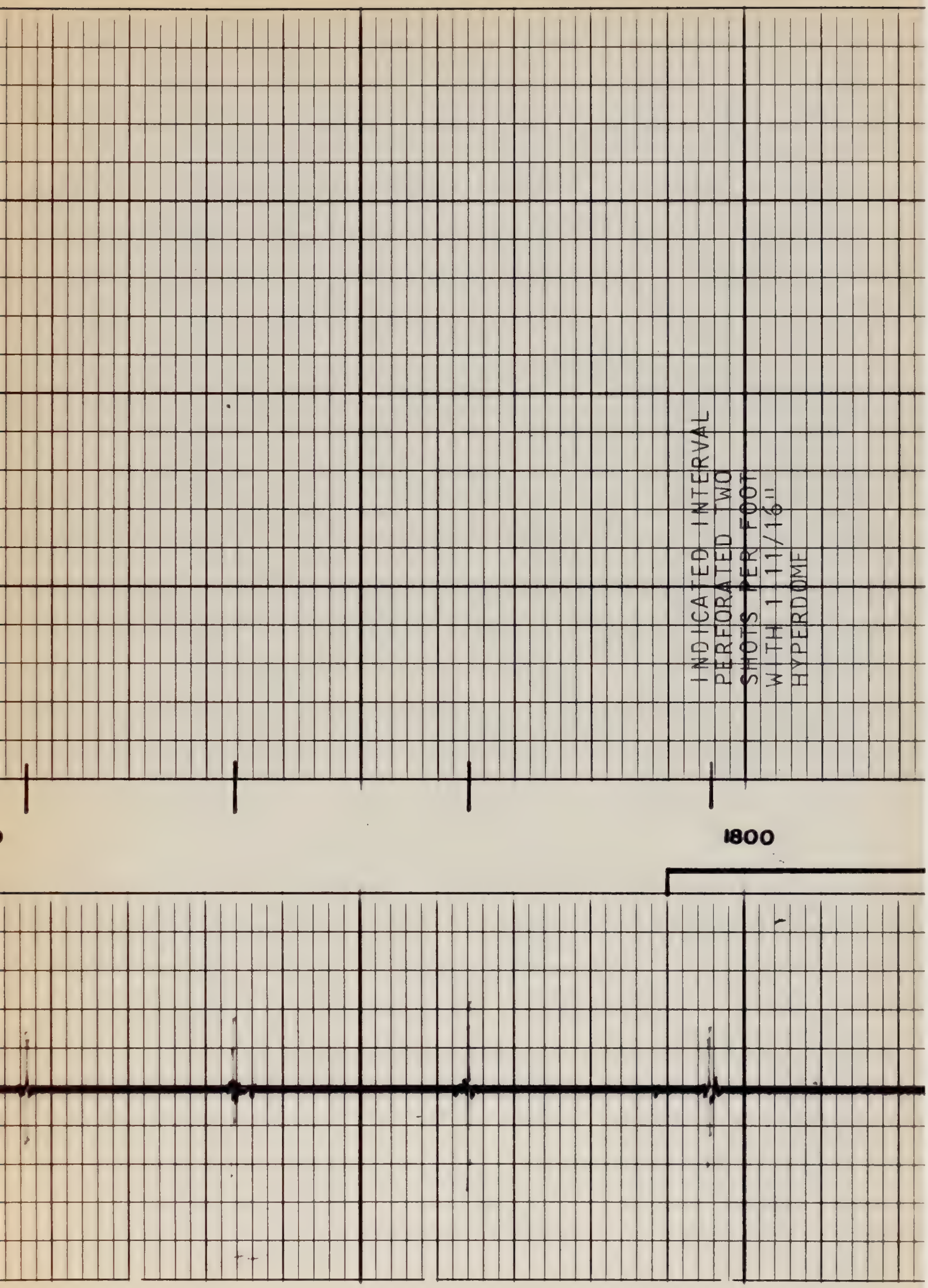
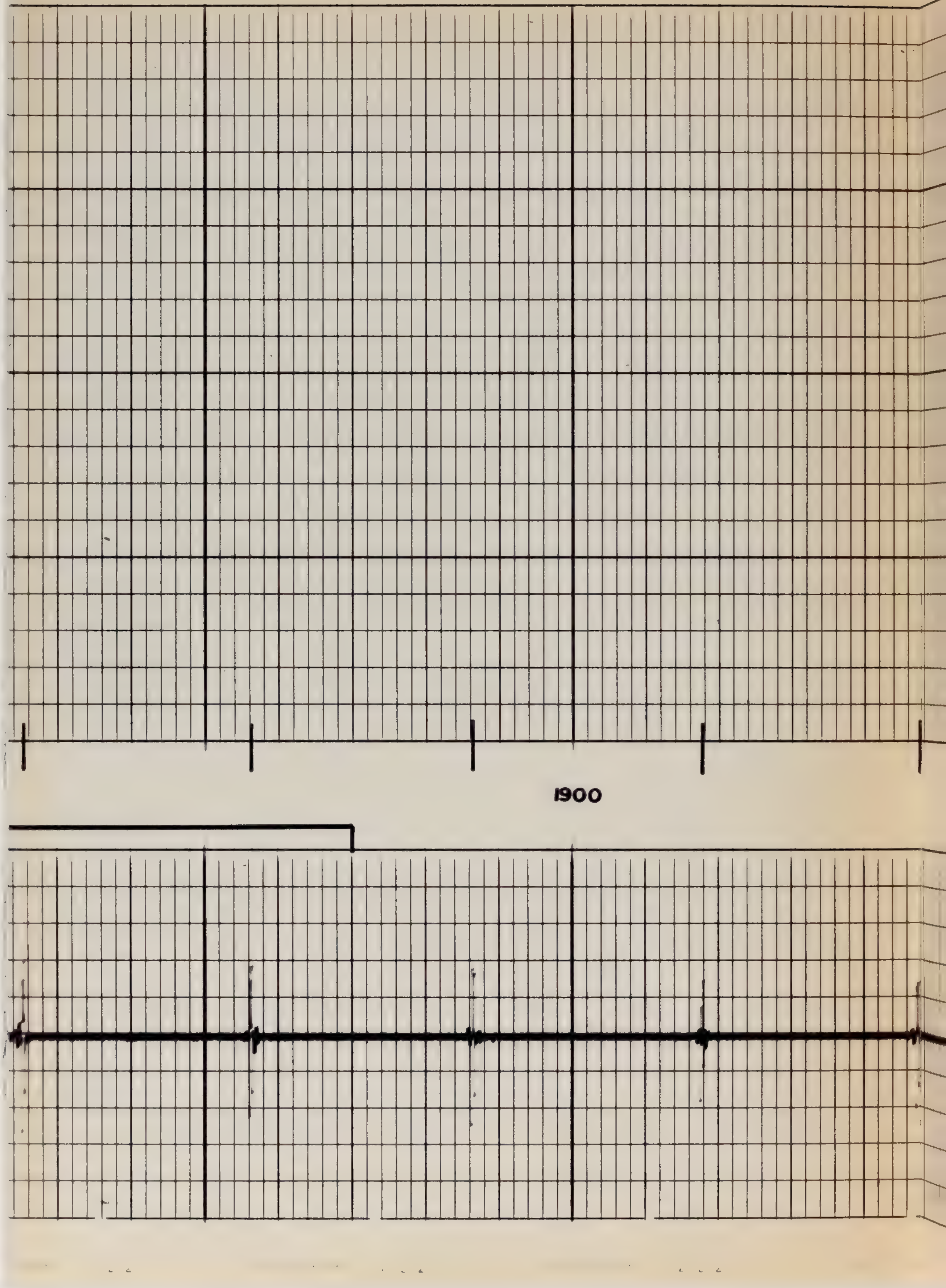

INDICATED INTERVAL
PERFORATED TWO SHOTS
PER FOOT WITH
1 11/16" HYPERDOME


INDICATED INTERVAL
PERFORATED TWO
SHOTS PER FOOT
WITH 1 11/16"
HYPERDOME
1800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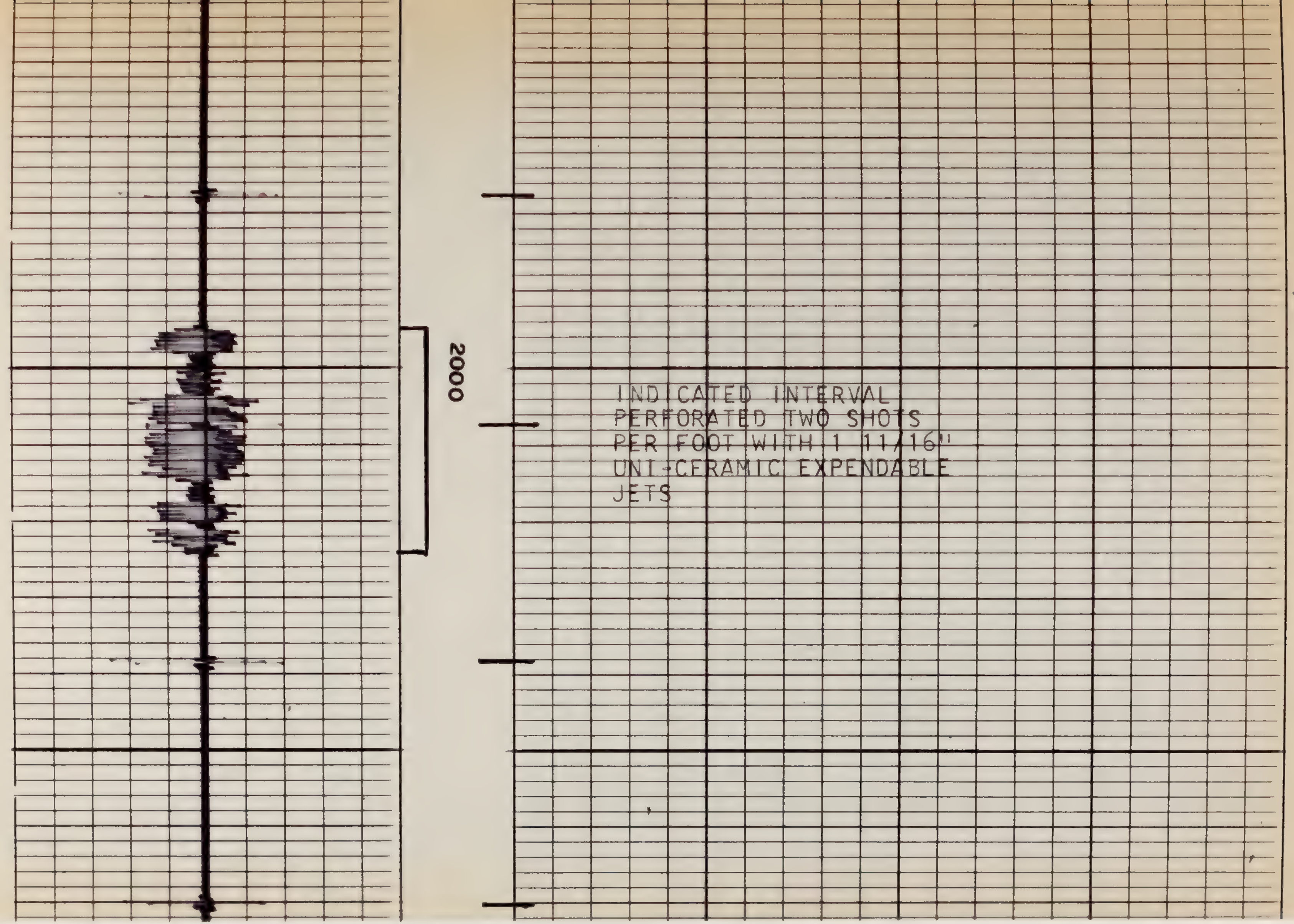
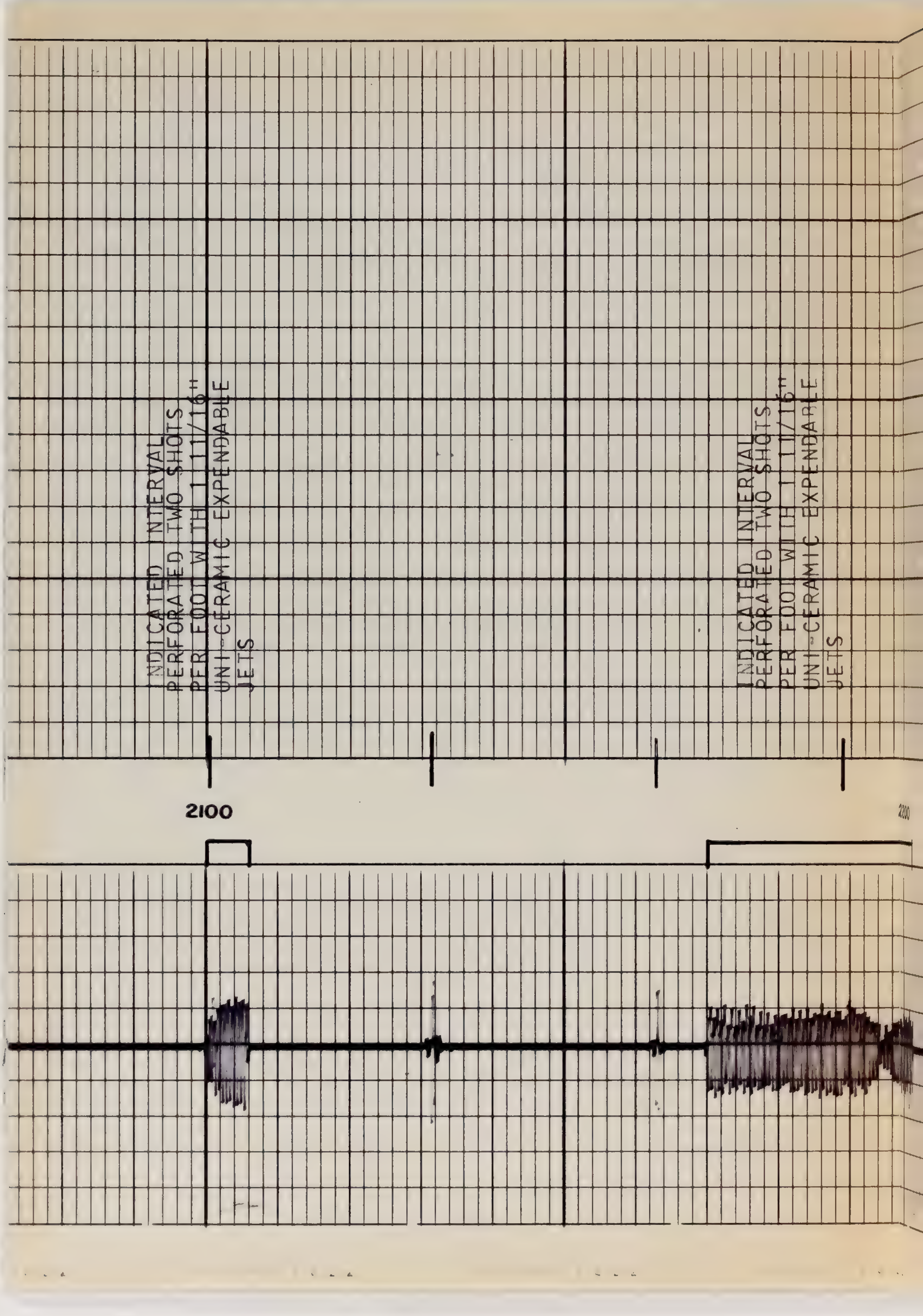
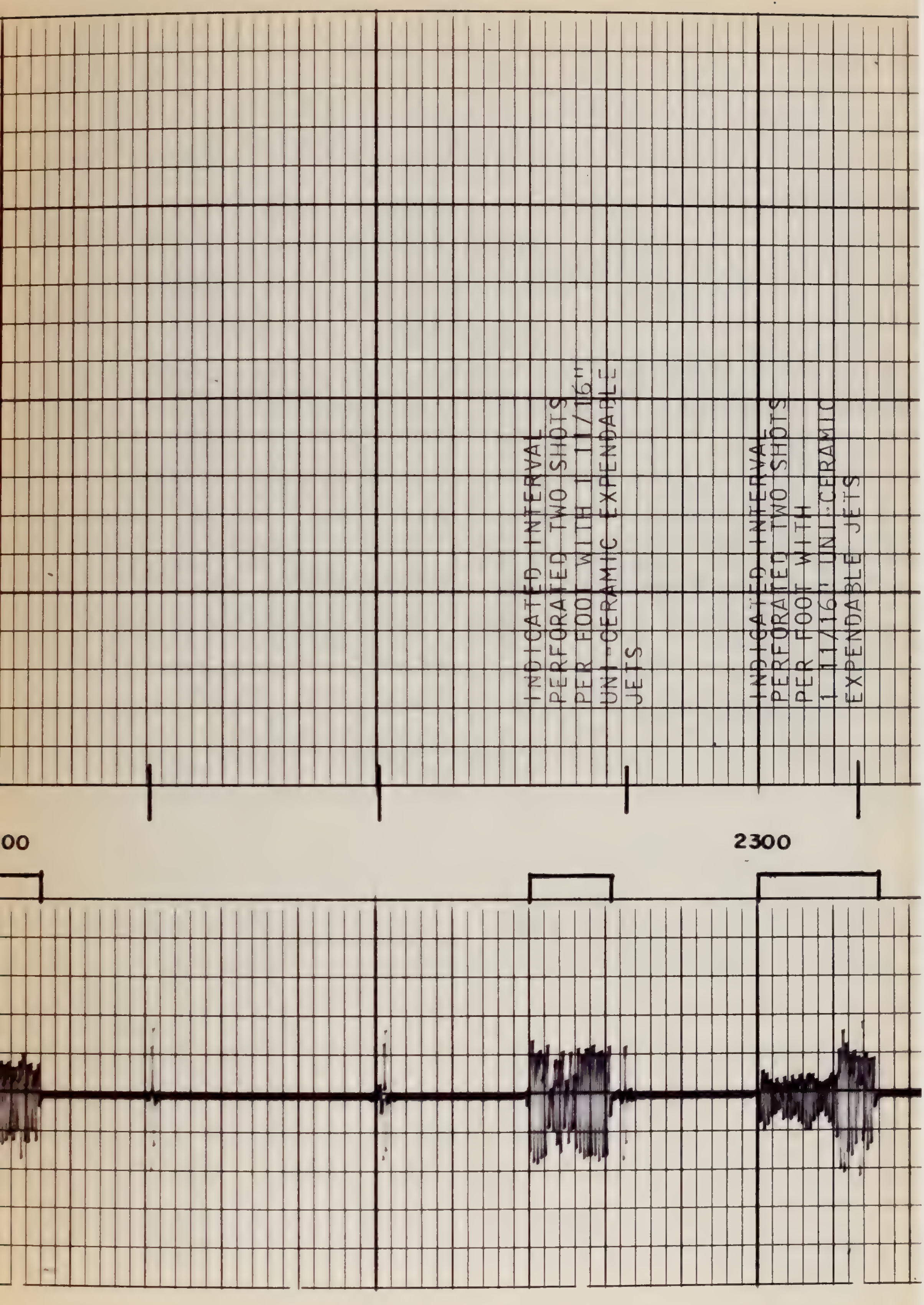
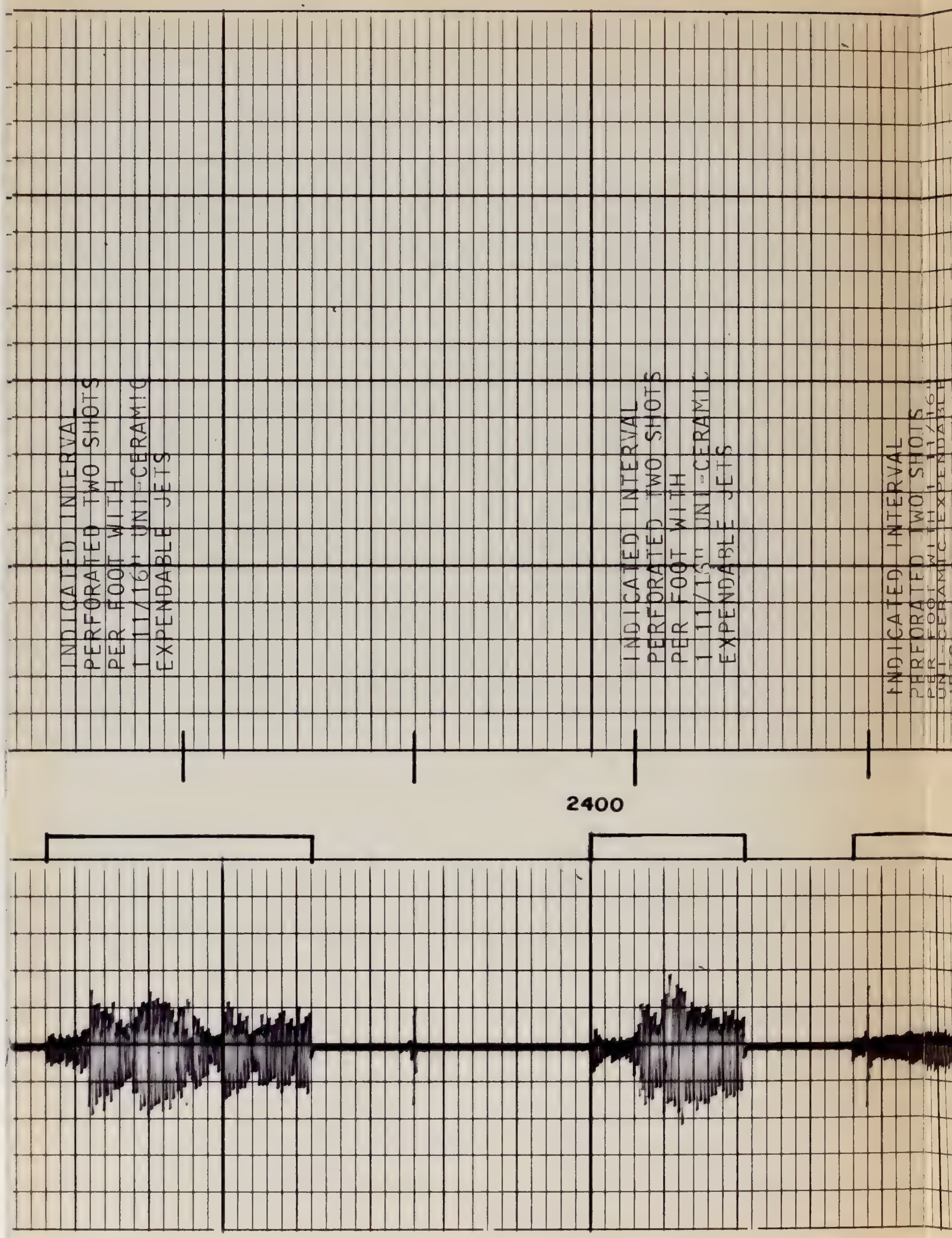
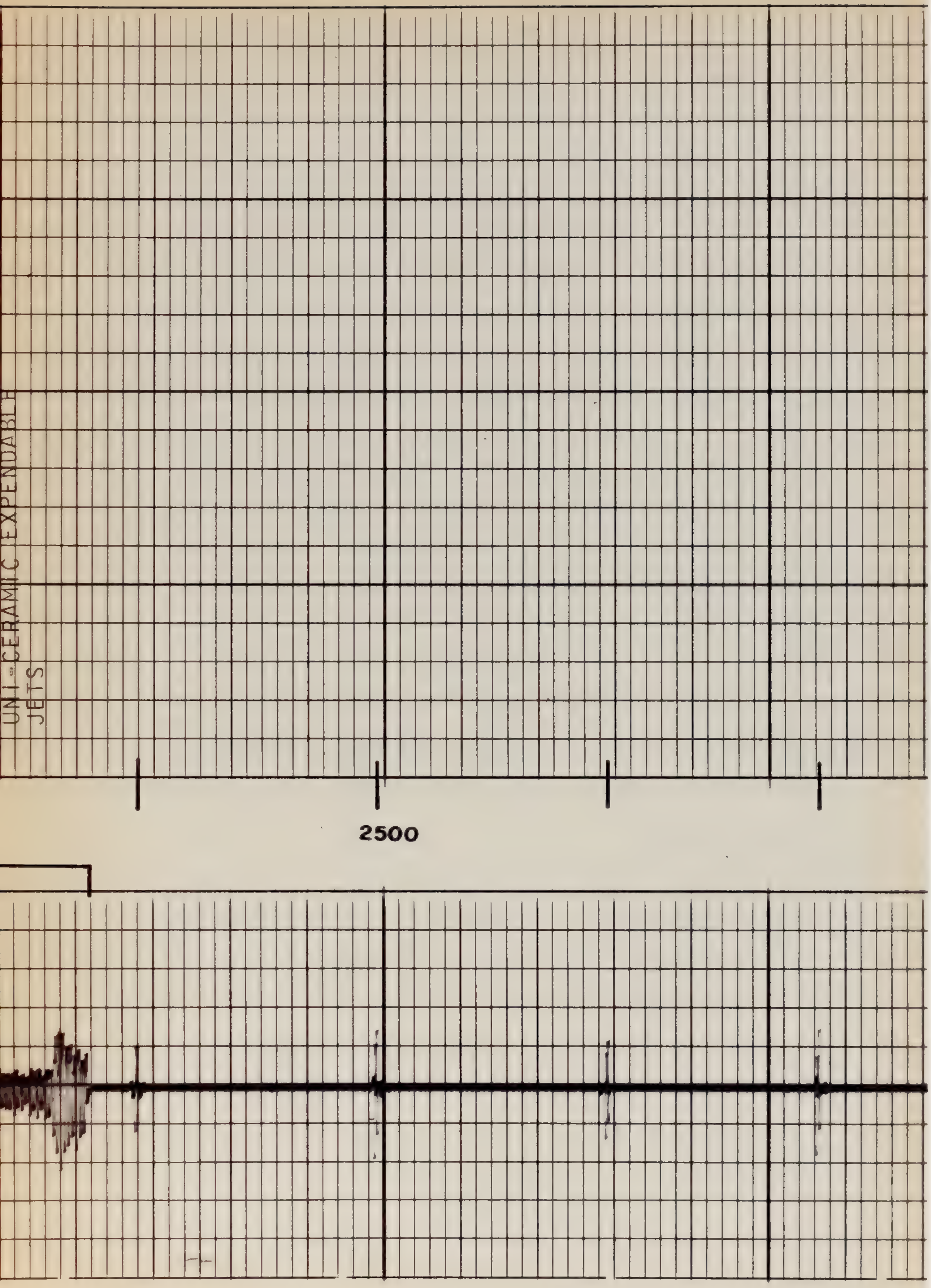


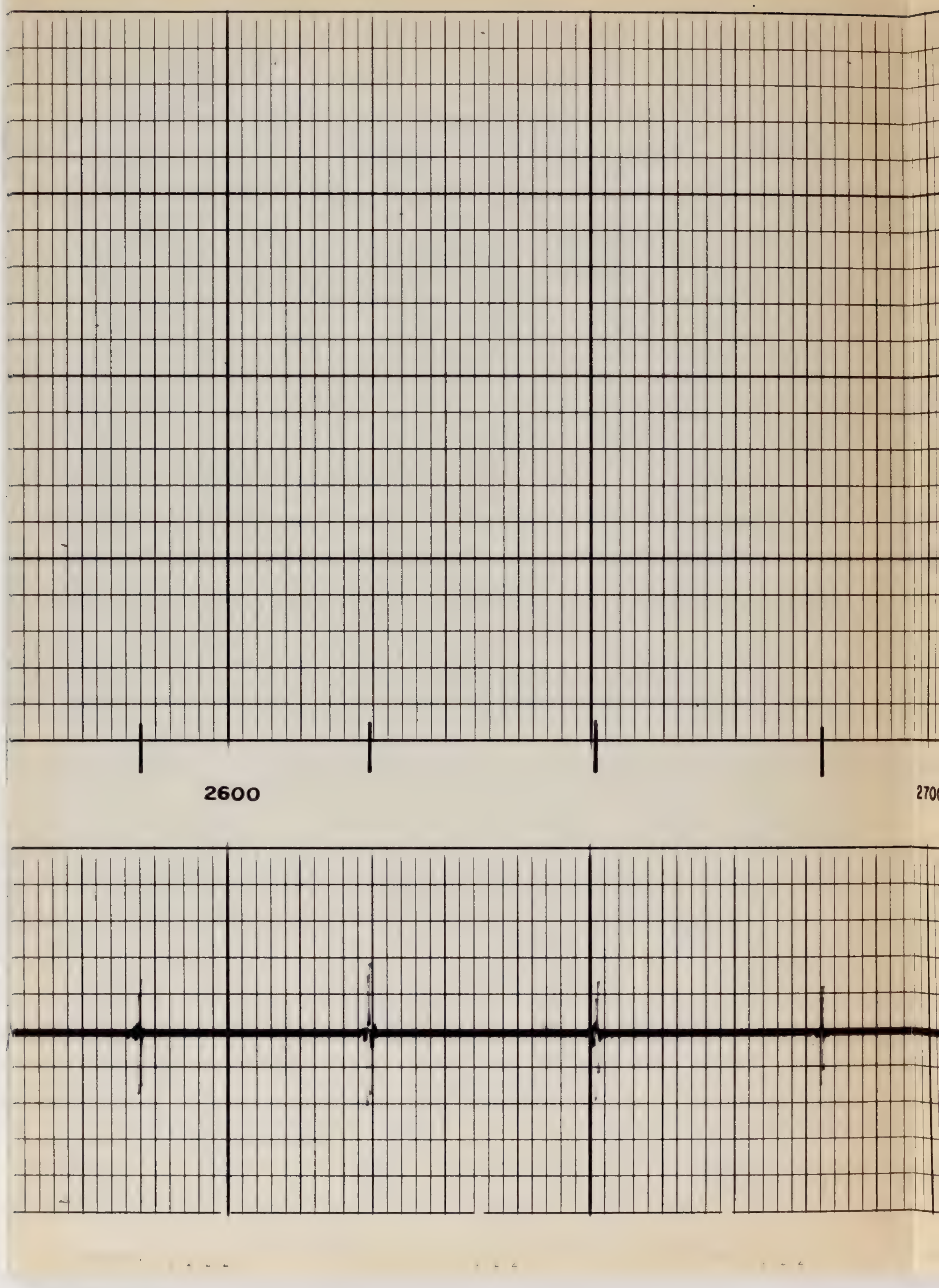
INDICATED INTERVAL
PERFORATED TWO SHOTS
PER FOOT WITH 1 11/16"
UNI-CERAMIC EXPENDABLE
JETS

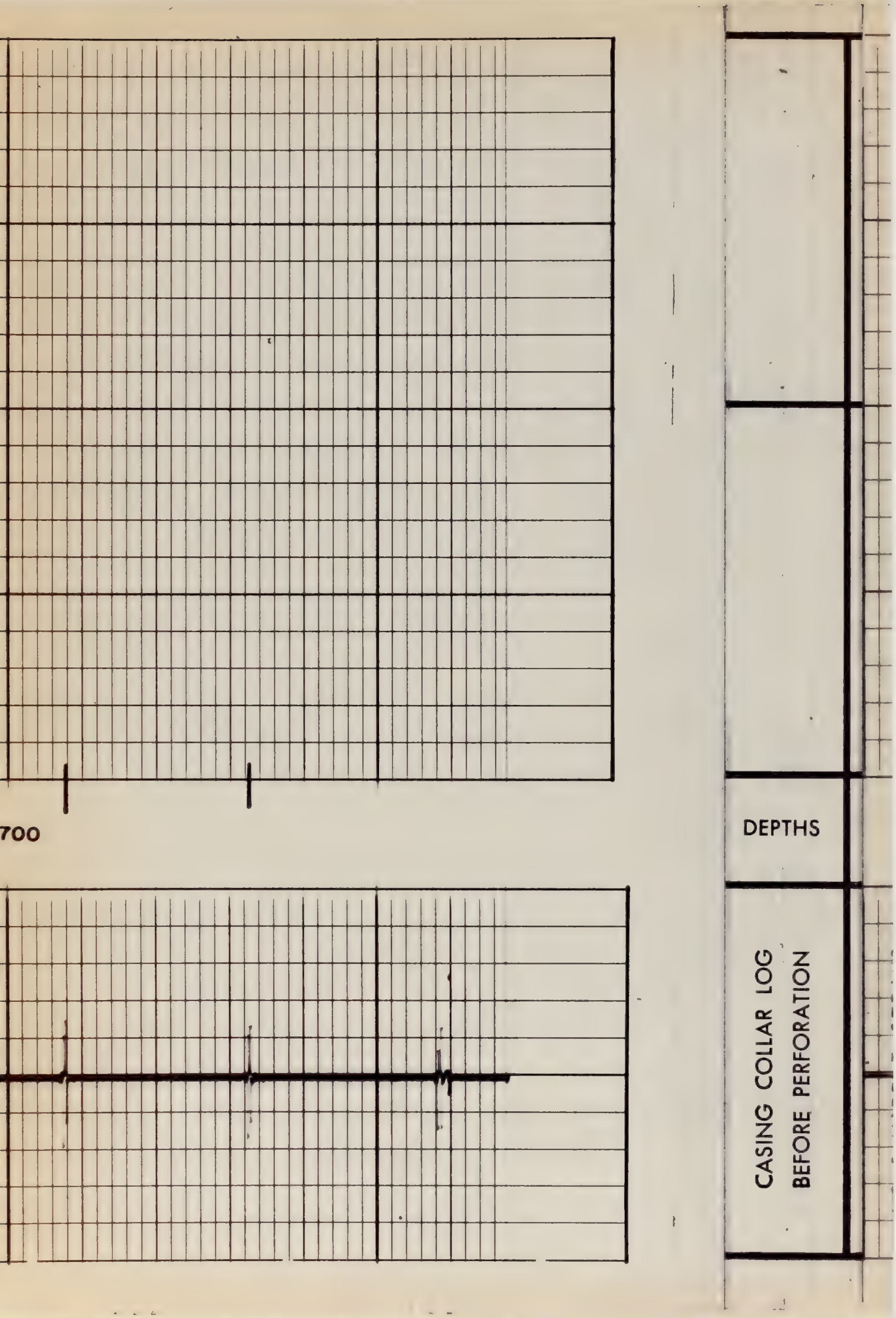

INDICATED INTERVAL PERFORATED TWO SHOTS PER FOOT WITH 1 11/16" UNI-CERAMIC EXPENDABLE JETS
INDICATED INTERVAL PERFORATED TWO SHOTS PER FOOT WITH 1 11/16" UNI-CERAMIC EXPENDABLE JETS
2100
2200

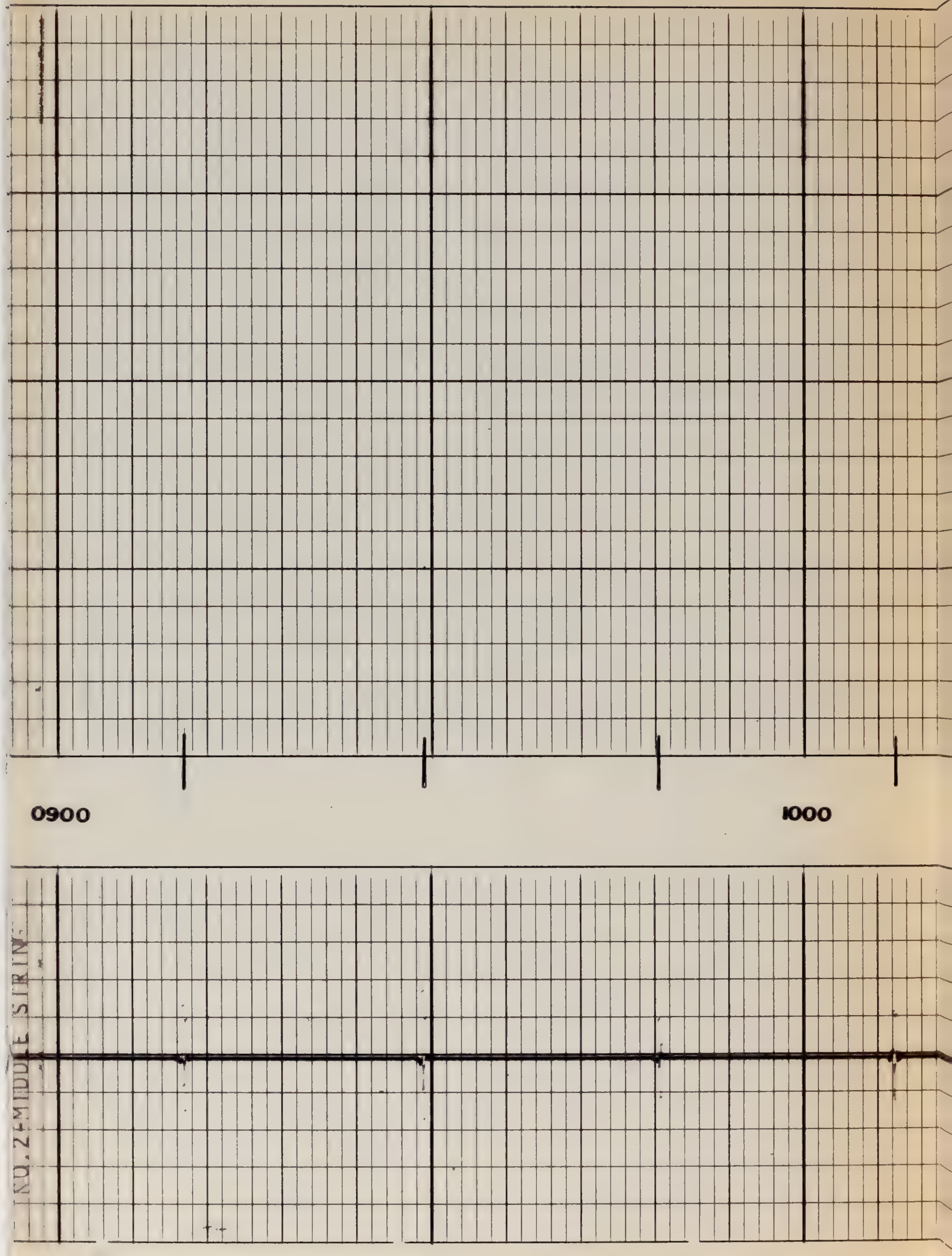

INDICATED INTERVAL
PERFORATED TWO SHOTS
PER FOOT WITH 1 11/16"
UNI-CERAMIC EXPENDABLE
JETS
INDICATED INTERVAL
PERFORATED TWO SHOTS
PER FOOT WITH
1 11/16" UNI-CERAMIC
EXPENDABLE JETS
00
2300

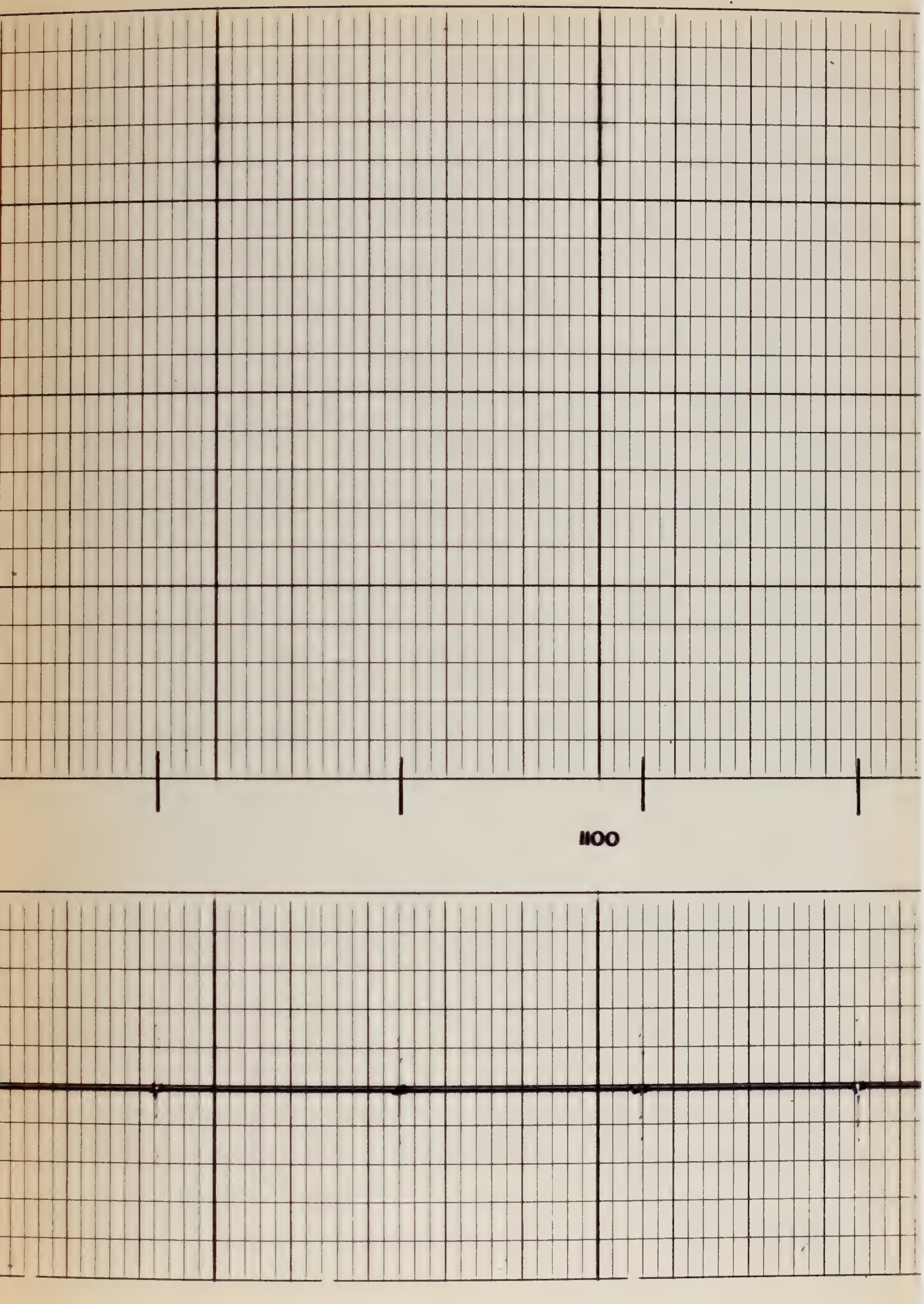

INDICATED INTERVAL
PERFORATED TWO SHOTS
PER FOOT WITH
1 11/16" UNI-CERAMIC
EXPENDABLE JETS
INDICATED INTERVAL
PERFORATED TWO SHOTS
PER FOOT WITH
1 11/15" UNI-CERAMIC
EXPENDABLE JETS
2400
INDICATED INTERVAL
PERFORATED TWO SHOTS
PER FOOT WITH 1 11/16"
UNI-CERAMIC EXPENDABLE


UNI-CERAMIC EXPENDABLE
JETS
2500


2600
2700


700
DEPTHS
CASING COLLAR LOG
BEFORE PERFORATION


0900
1000
NO. 2-MIDDLE STRIN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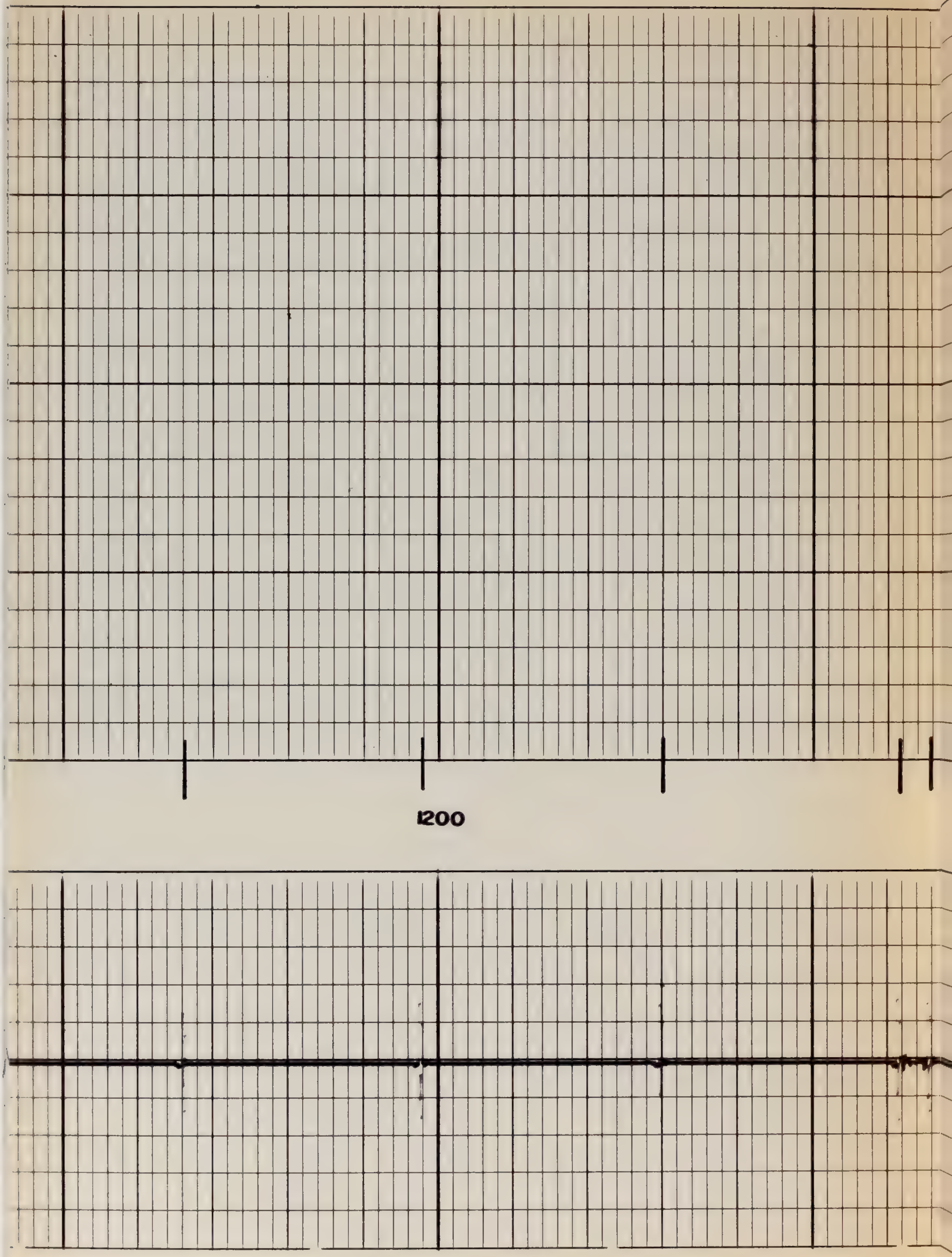
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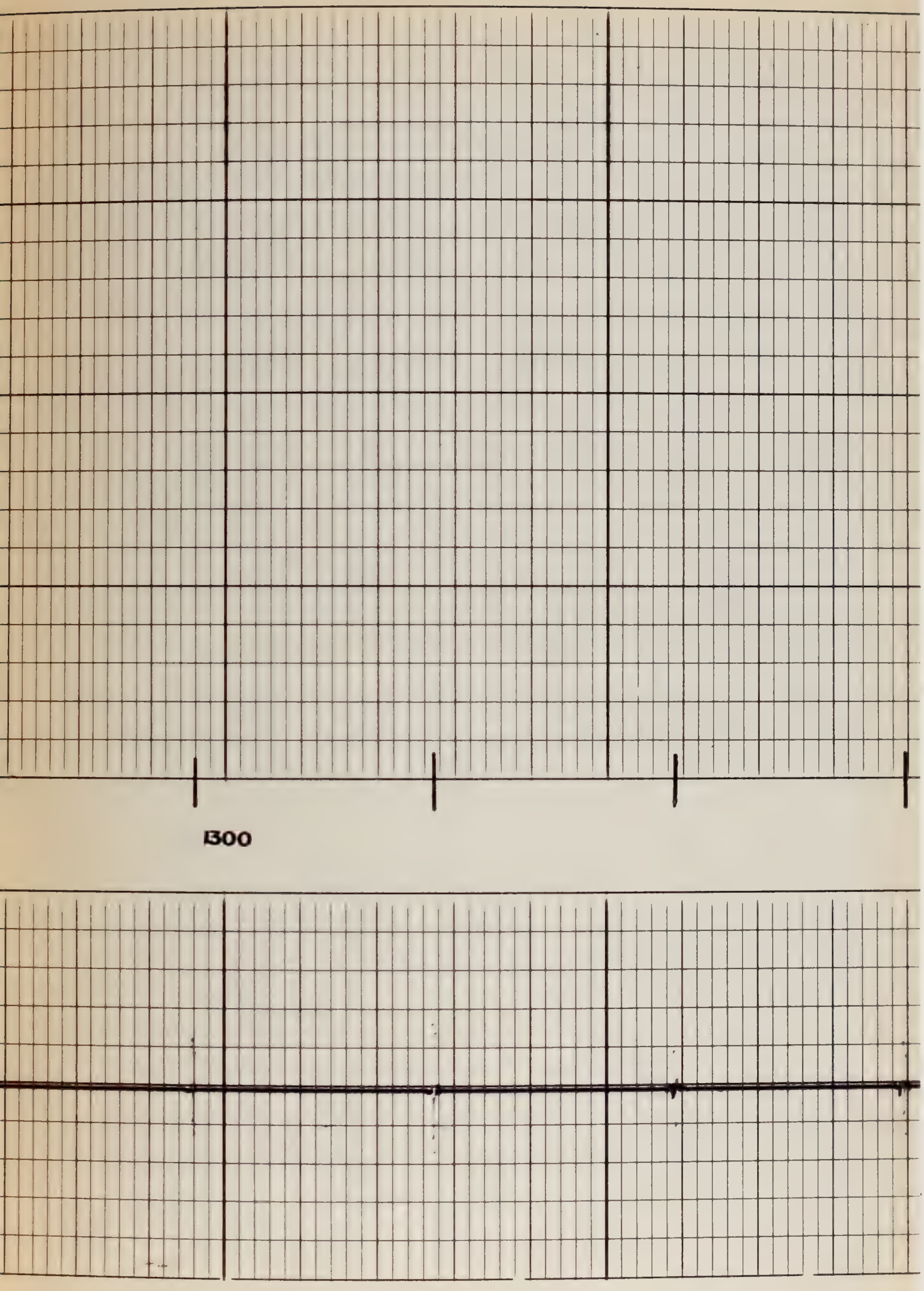
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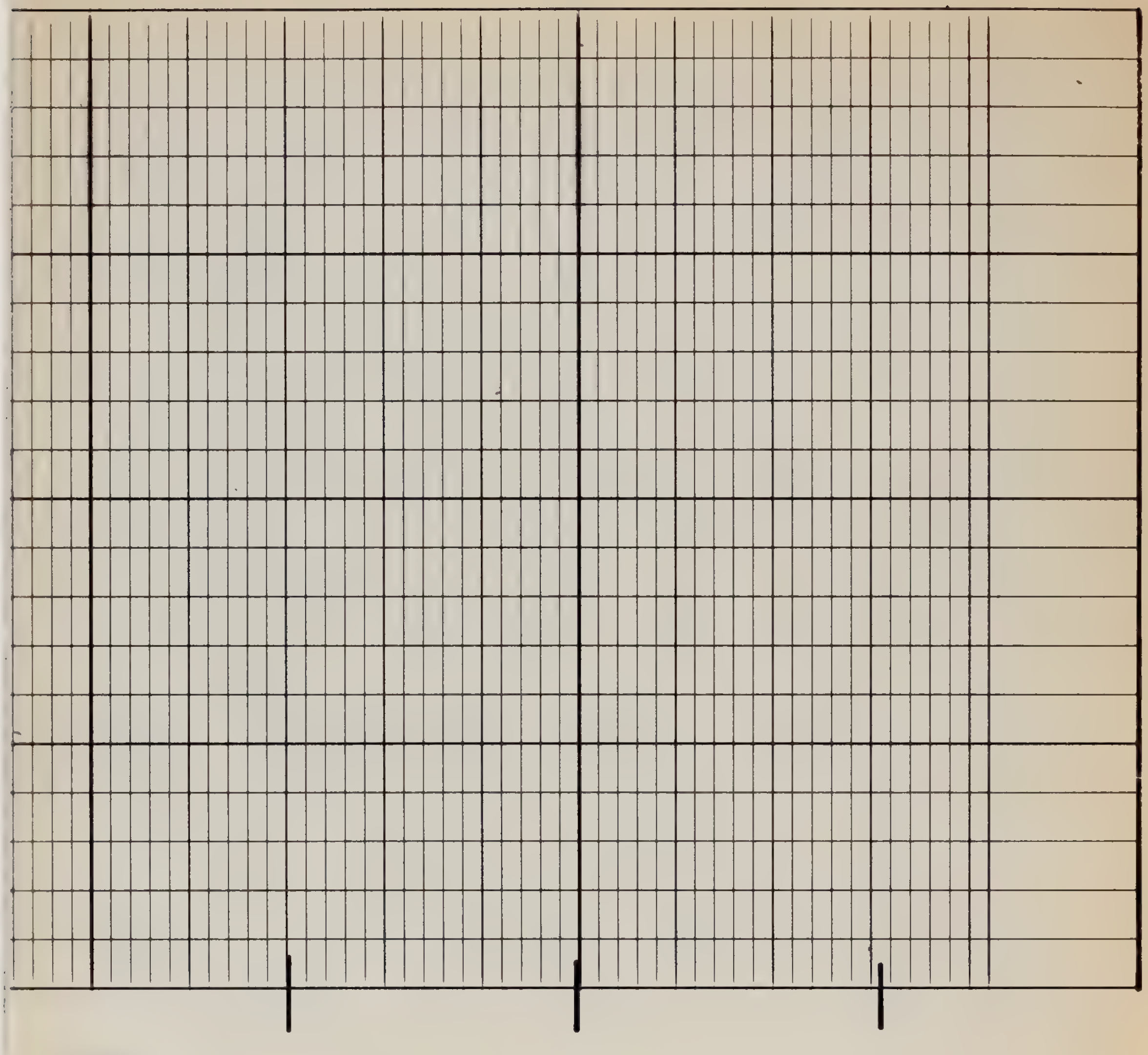
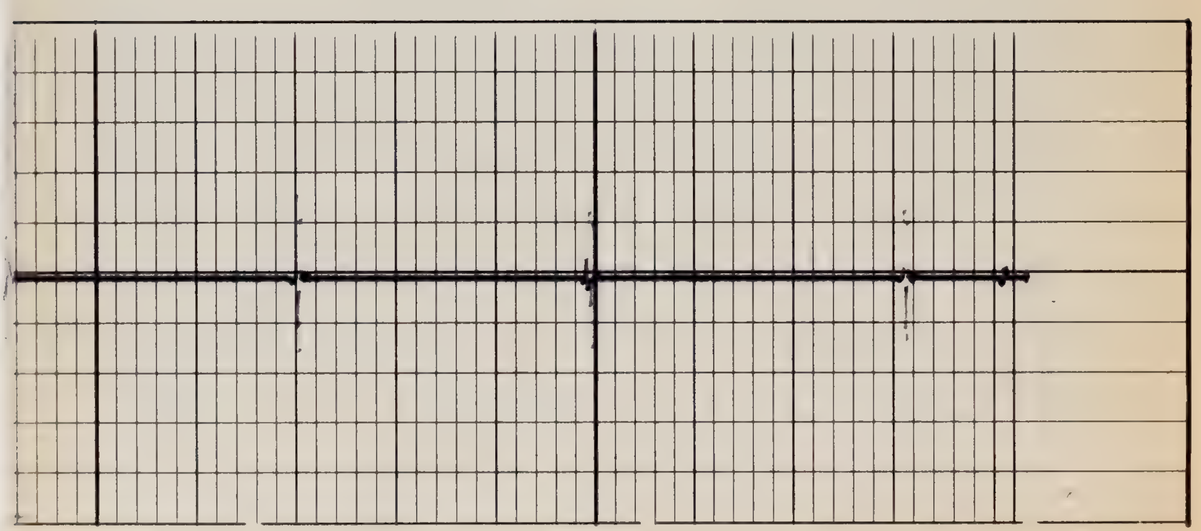
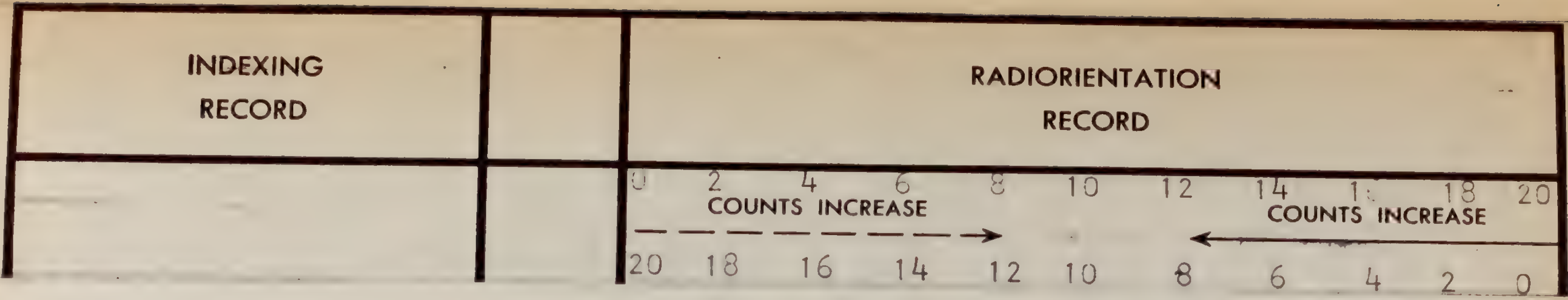
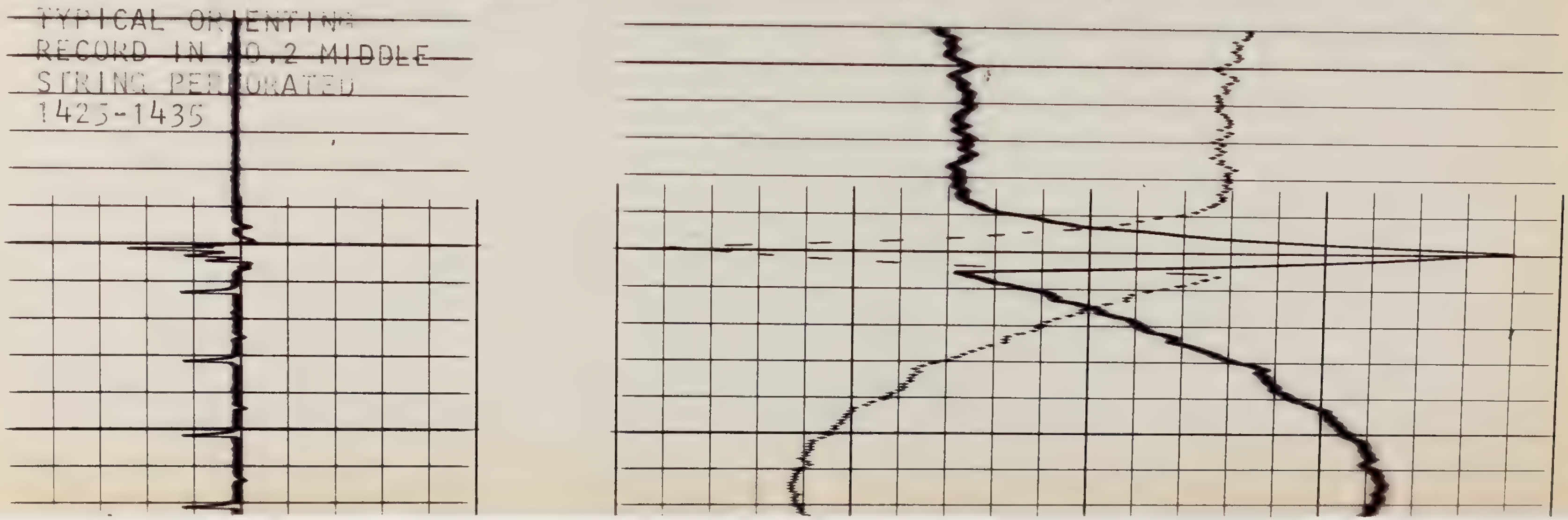


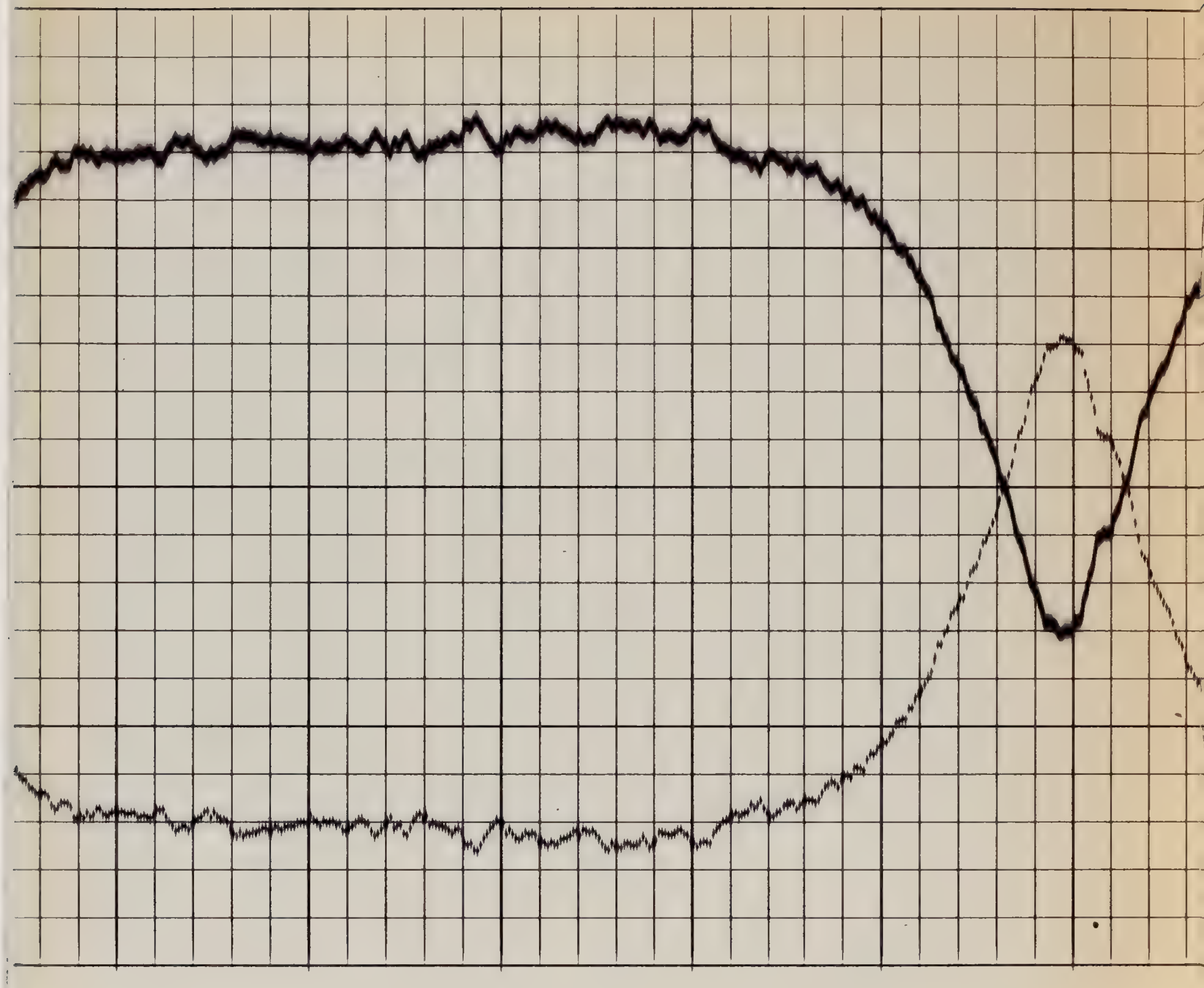
1400

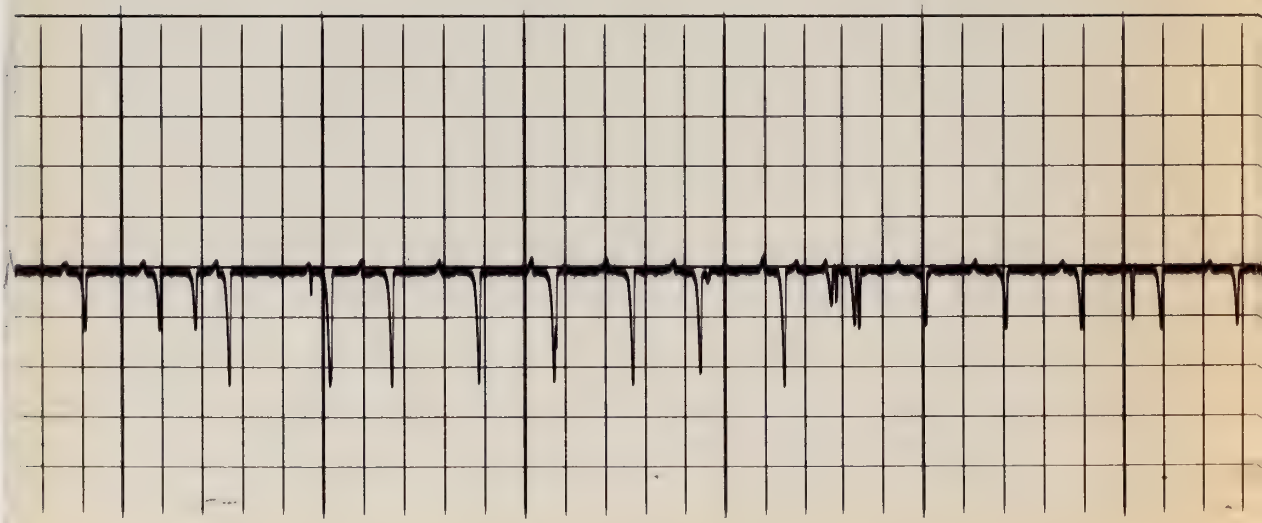


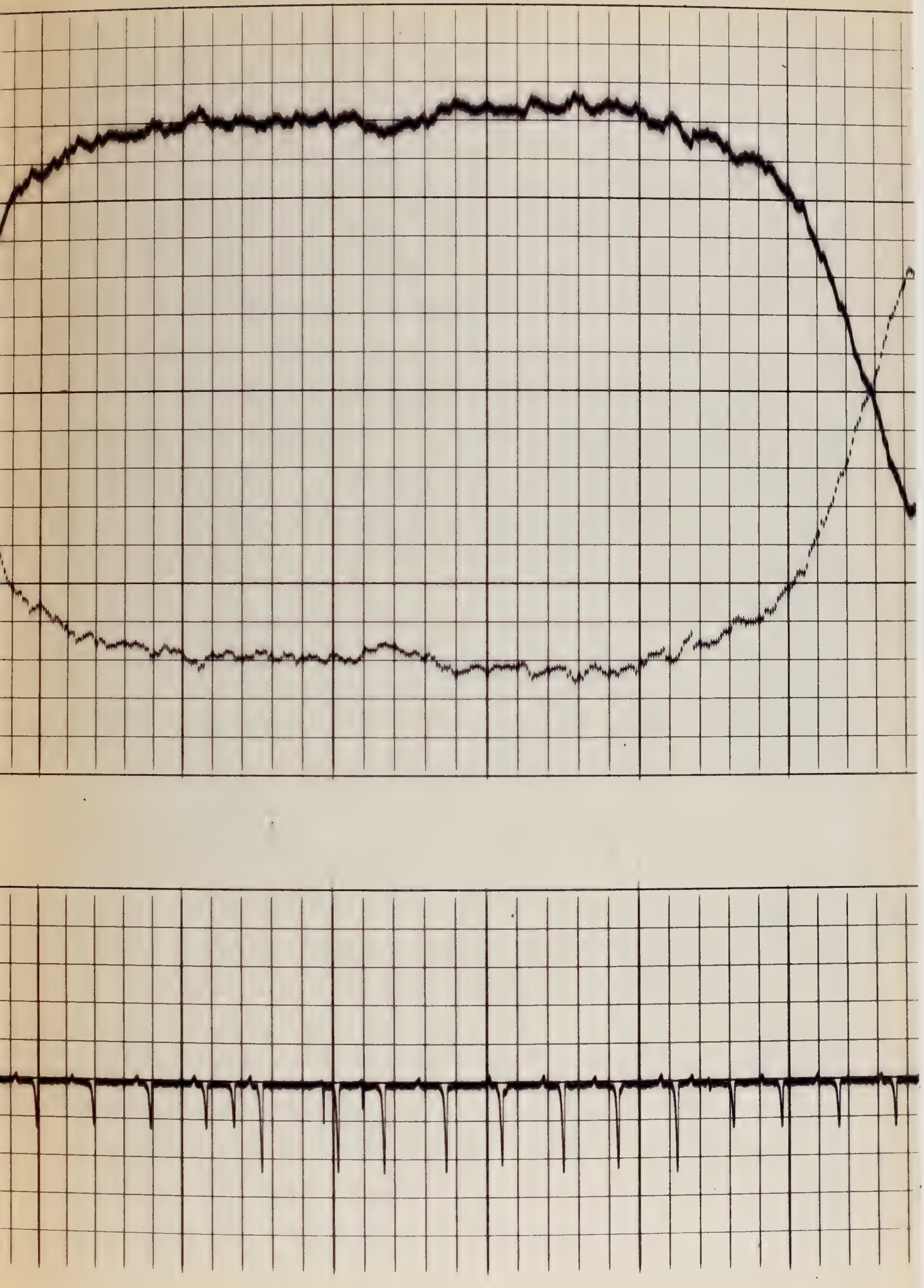

INDEXING
RECORD
RADIORIENTATION
RECORD
0 2 4 6 8 10 12 14 16 18 20
COUNTS INCREASE
COUNTS INCREASE
20 18 16 14 12 10 8 6 4 2 0

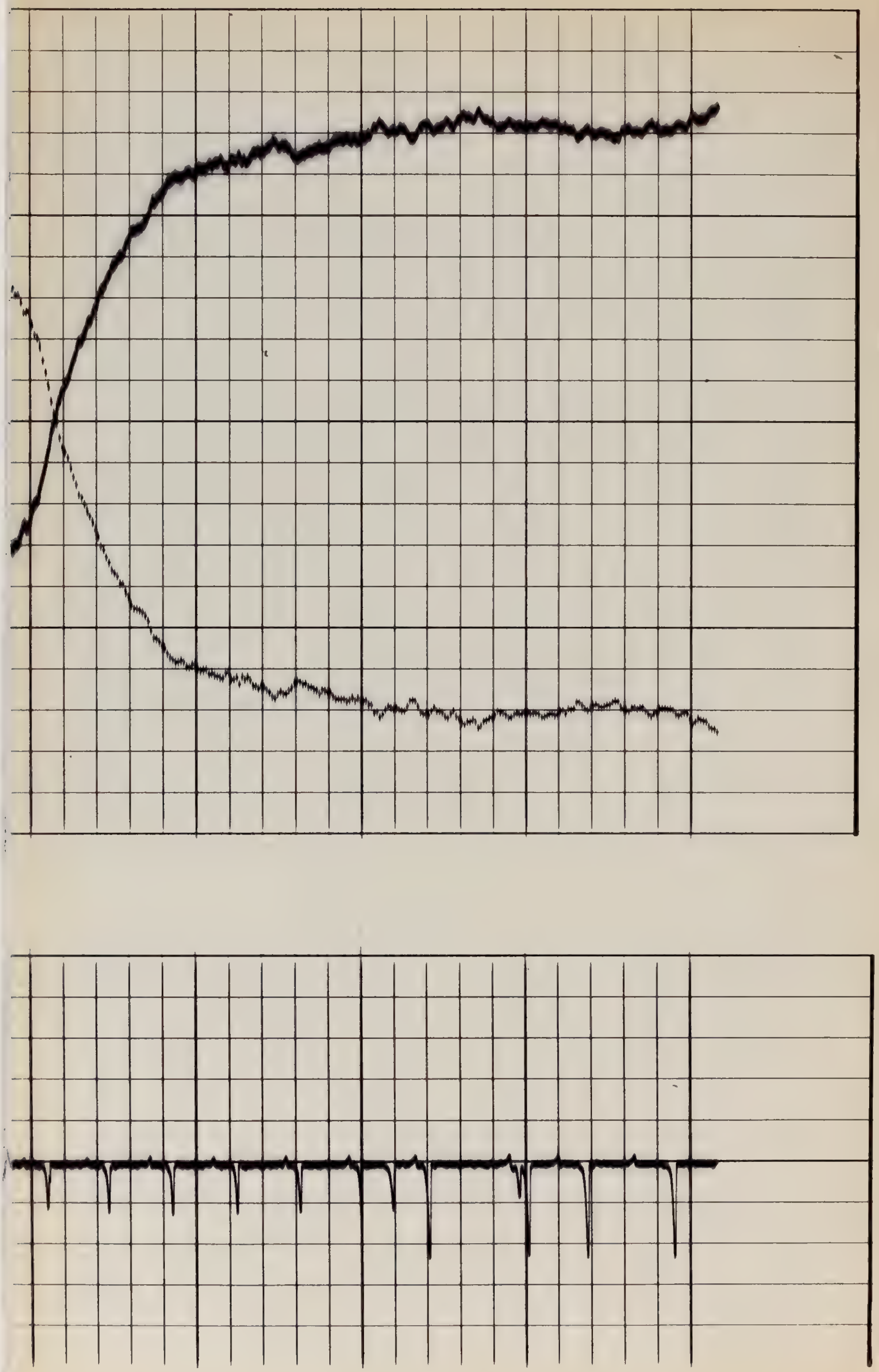
TYPICAL ORIENTING RECORD IN NO.2 MIDDLE STRING







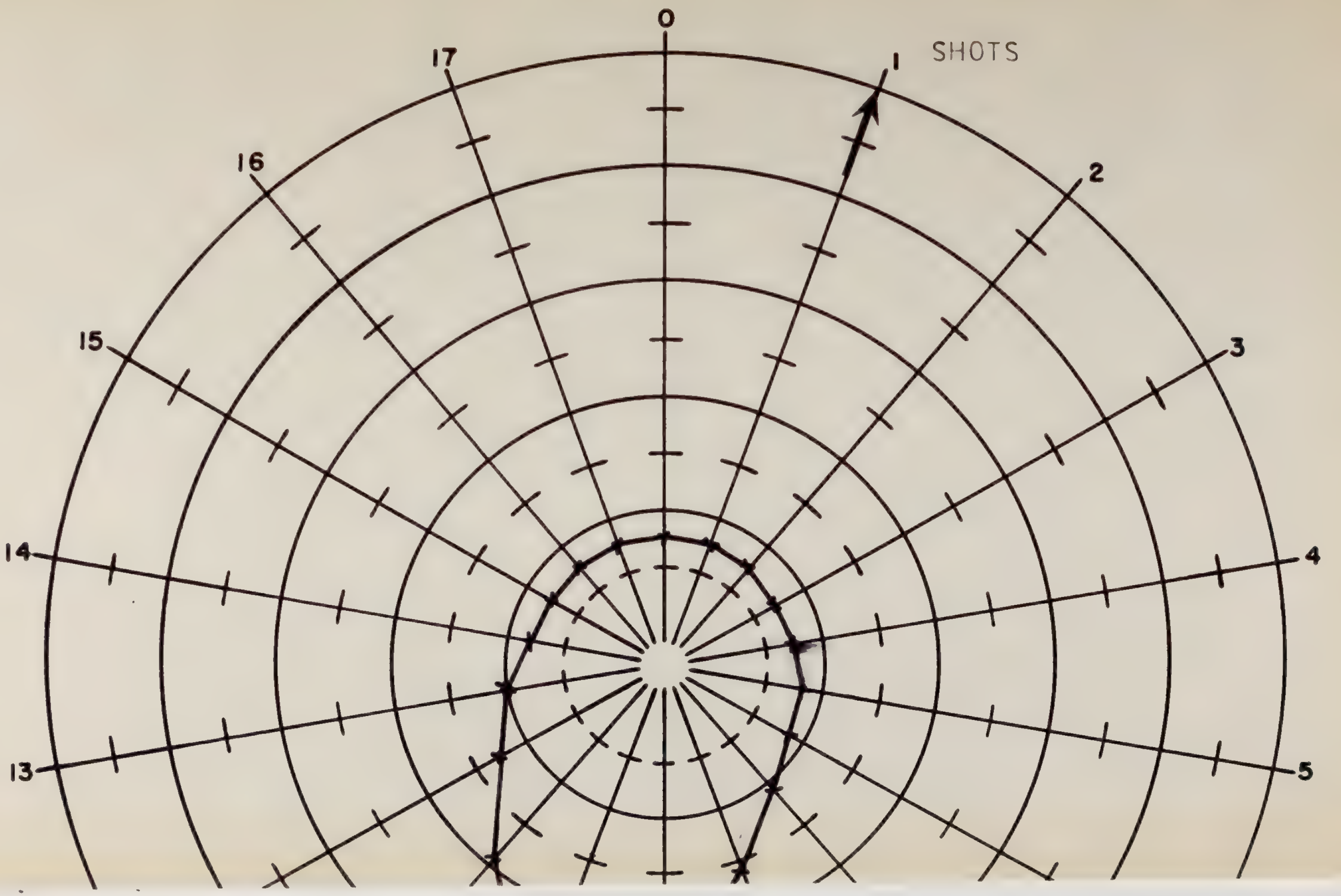


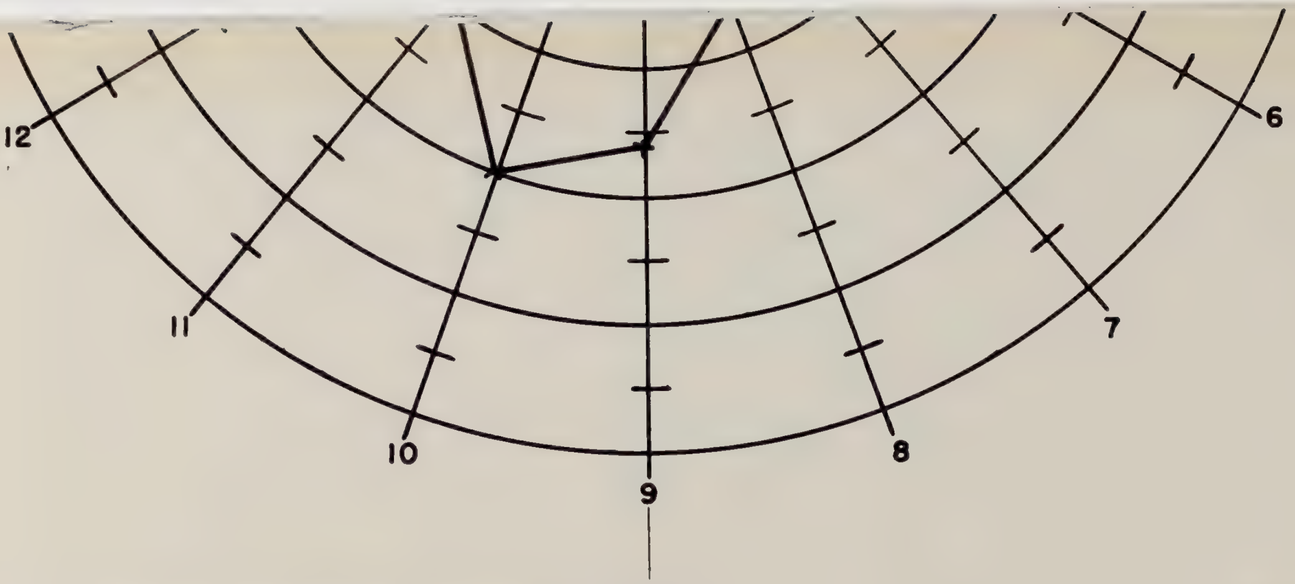


RADIORIENTATION PLOT

POT-B

NO.2-MIDDLE STRING PERFORATED 1425-1435 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOM





This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by vagrant metal in the drill hole and other conditions unknown to us.

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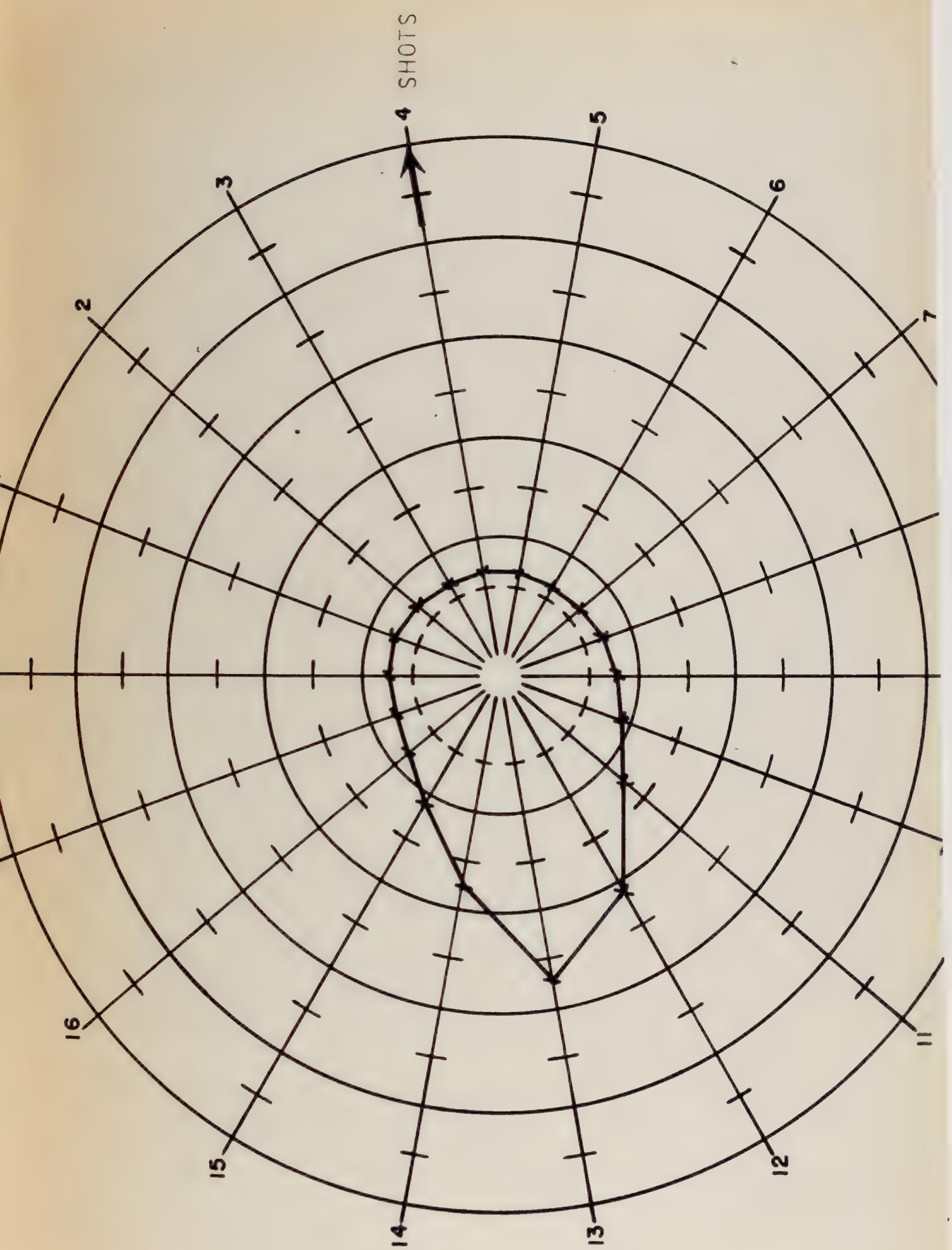
RADIORIENTATION PLOT

POT-B

NO.2-MIDDLE STRING PERFORATED 1414-1424 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME


2
3
4 SHOTS
5
6
7
11
12
13
14
15
16

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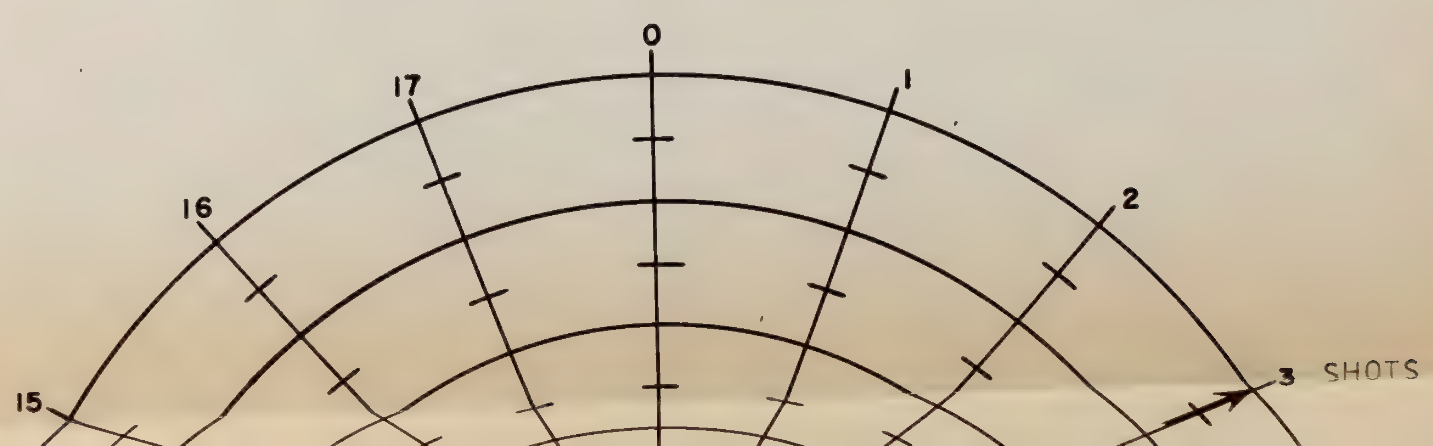
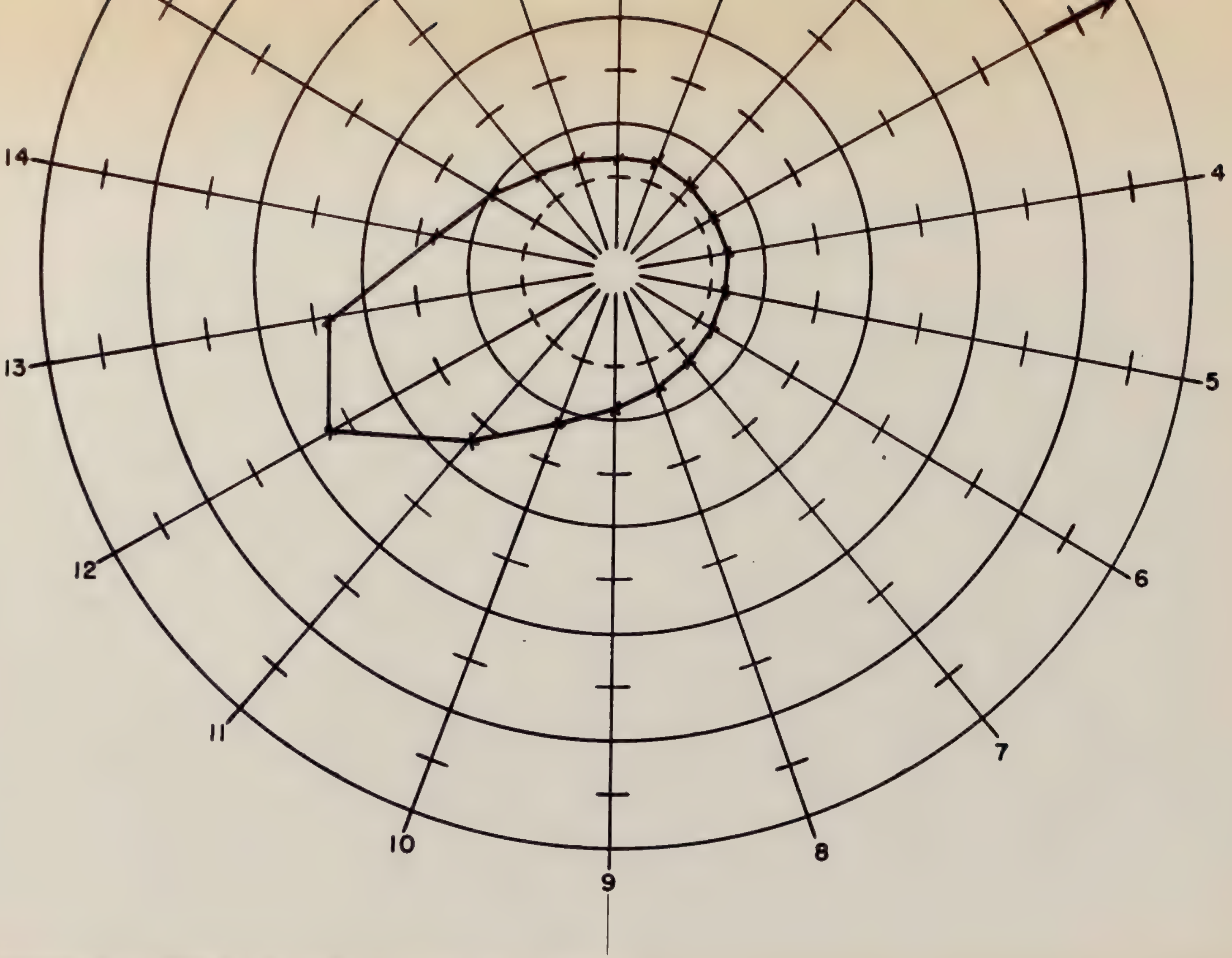
RADIORIENTATION PLOT

POT-B

NO.2-MIDDLE STRING PERFORATED 1403-1413 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





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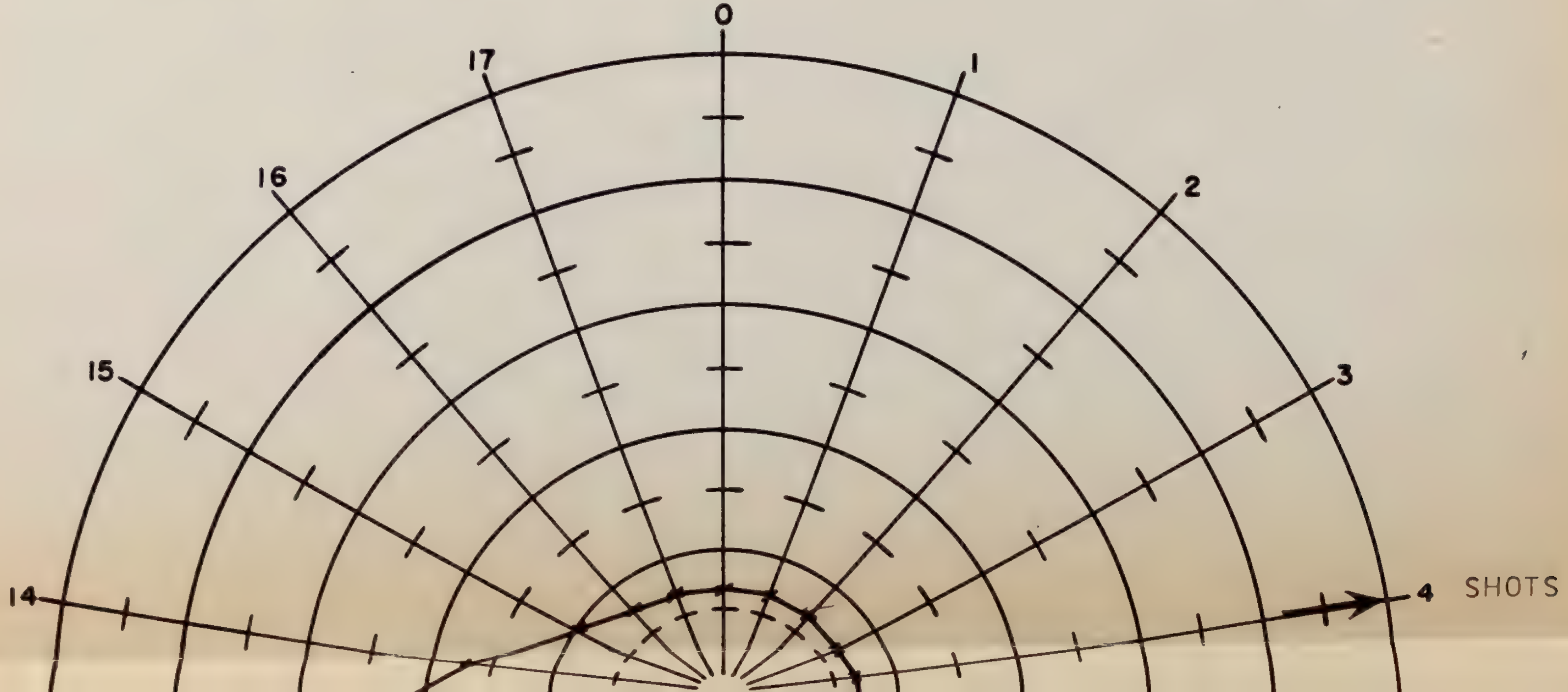
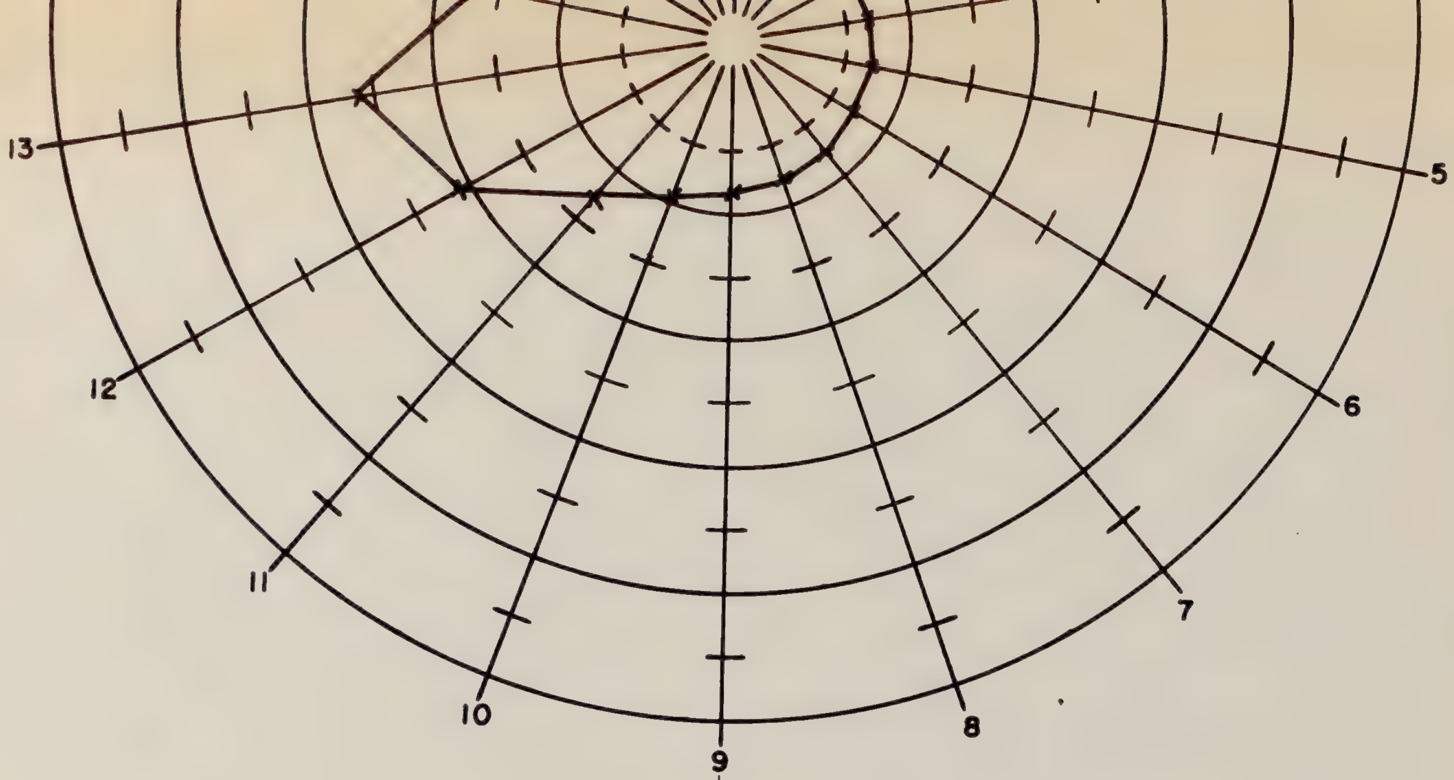
RADIORIENTATION PLOT

POT-B

NO.2 MIDDLE STRING PERFORATED 1393-1402 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





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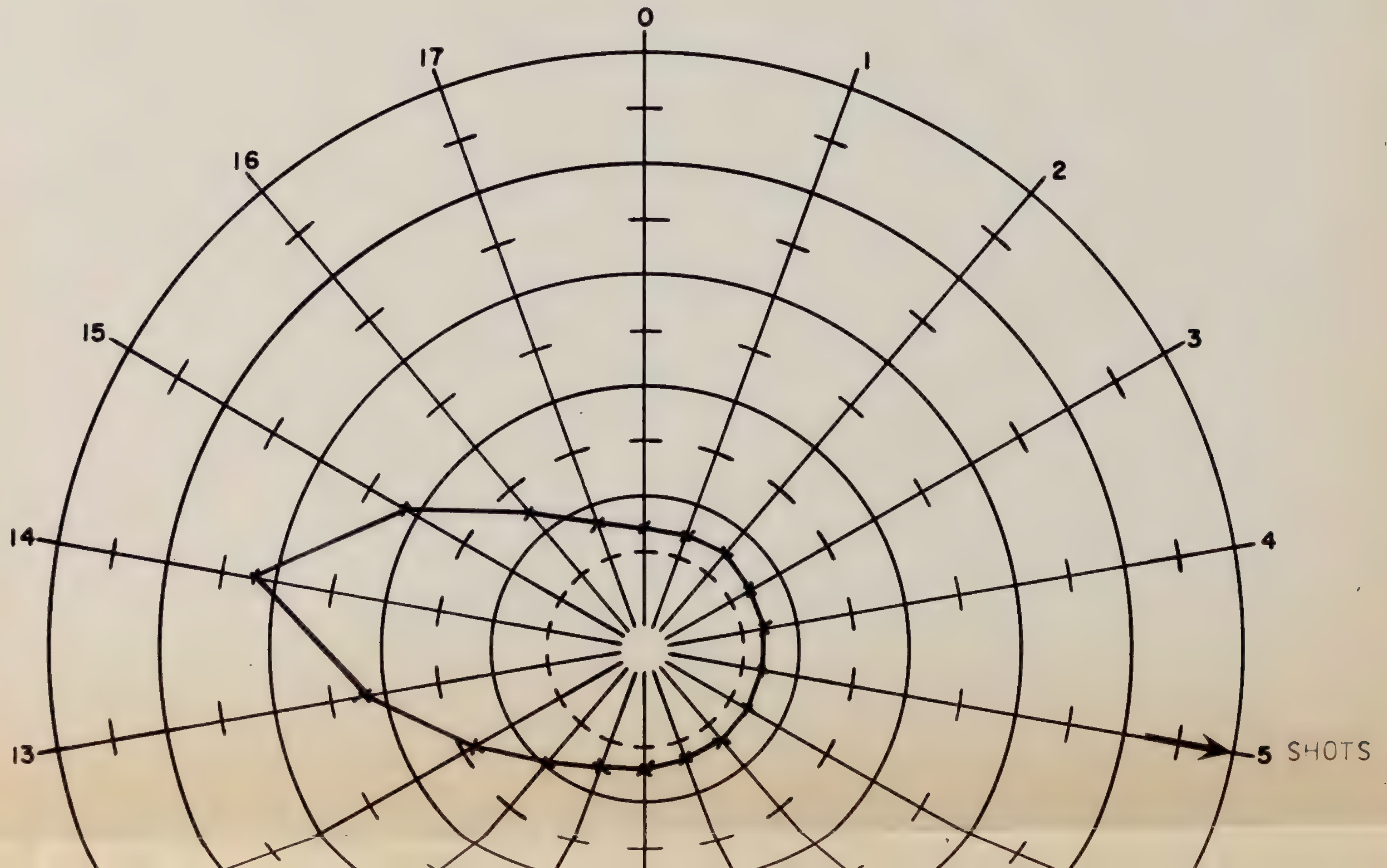
Schlumberger

RADIORIENTATION PLOT

POT-B

NO.2-MIDDLE STRING PERFORATED 1385-1392 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME



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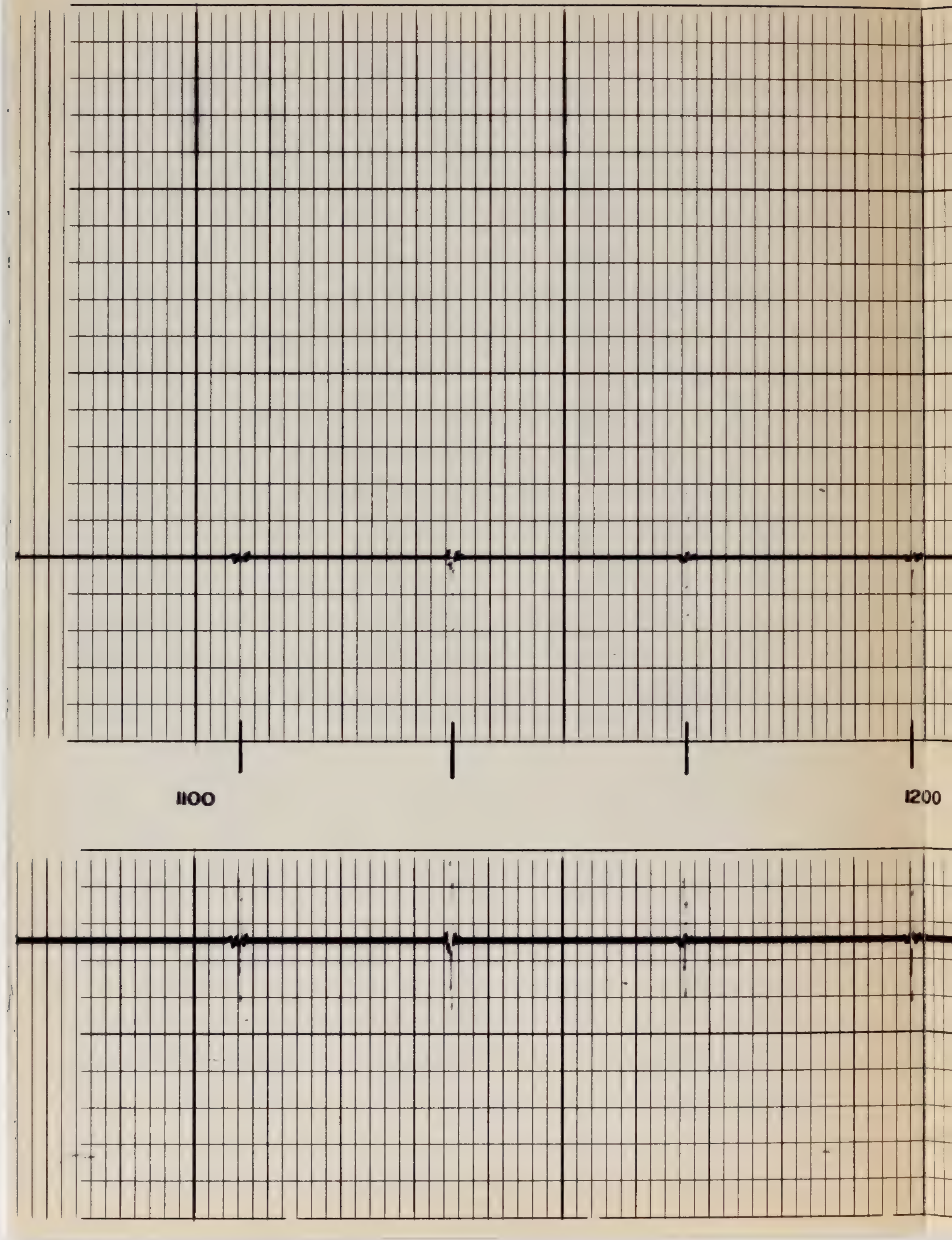
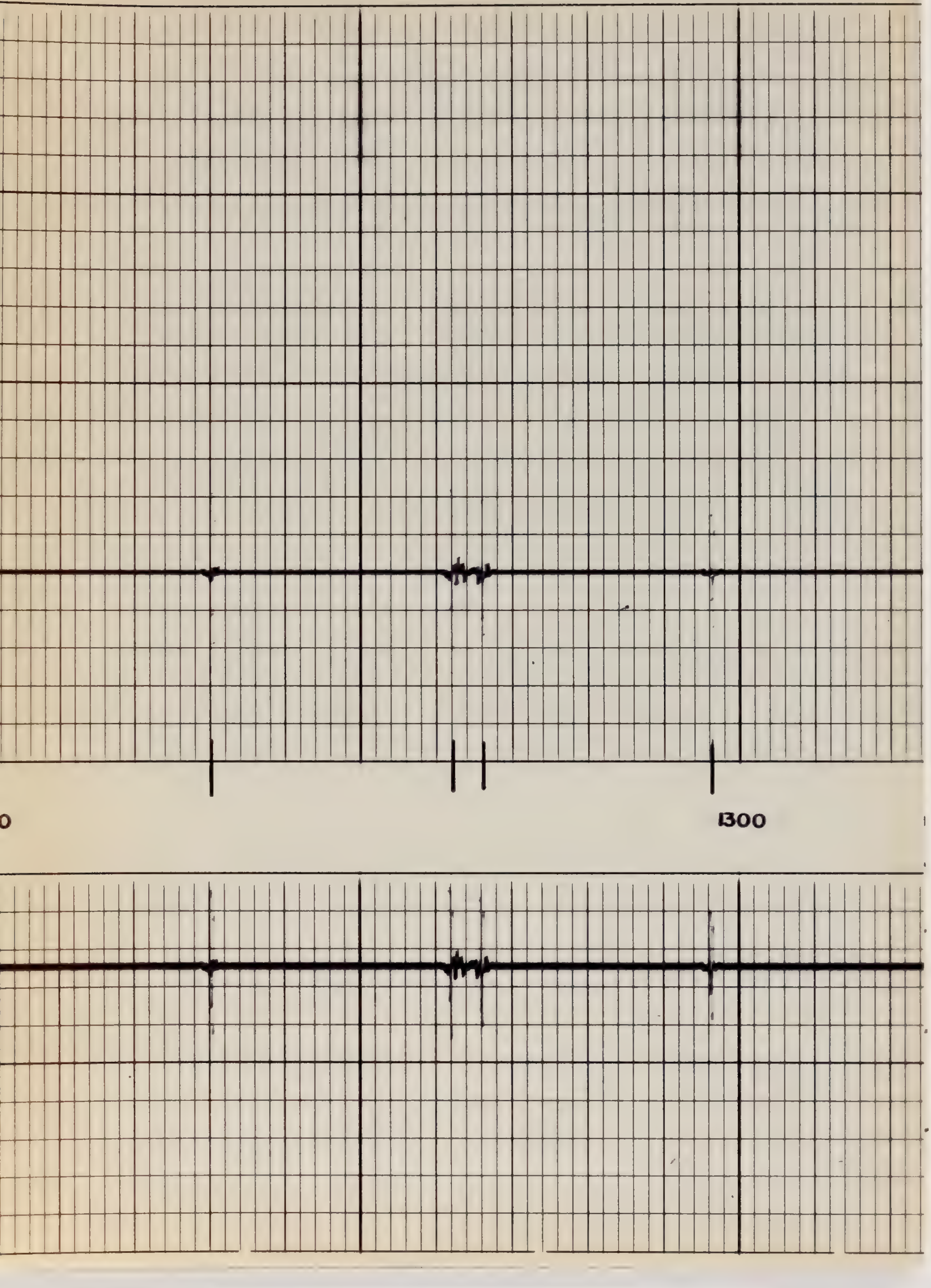
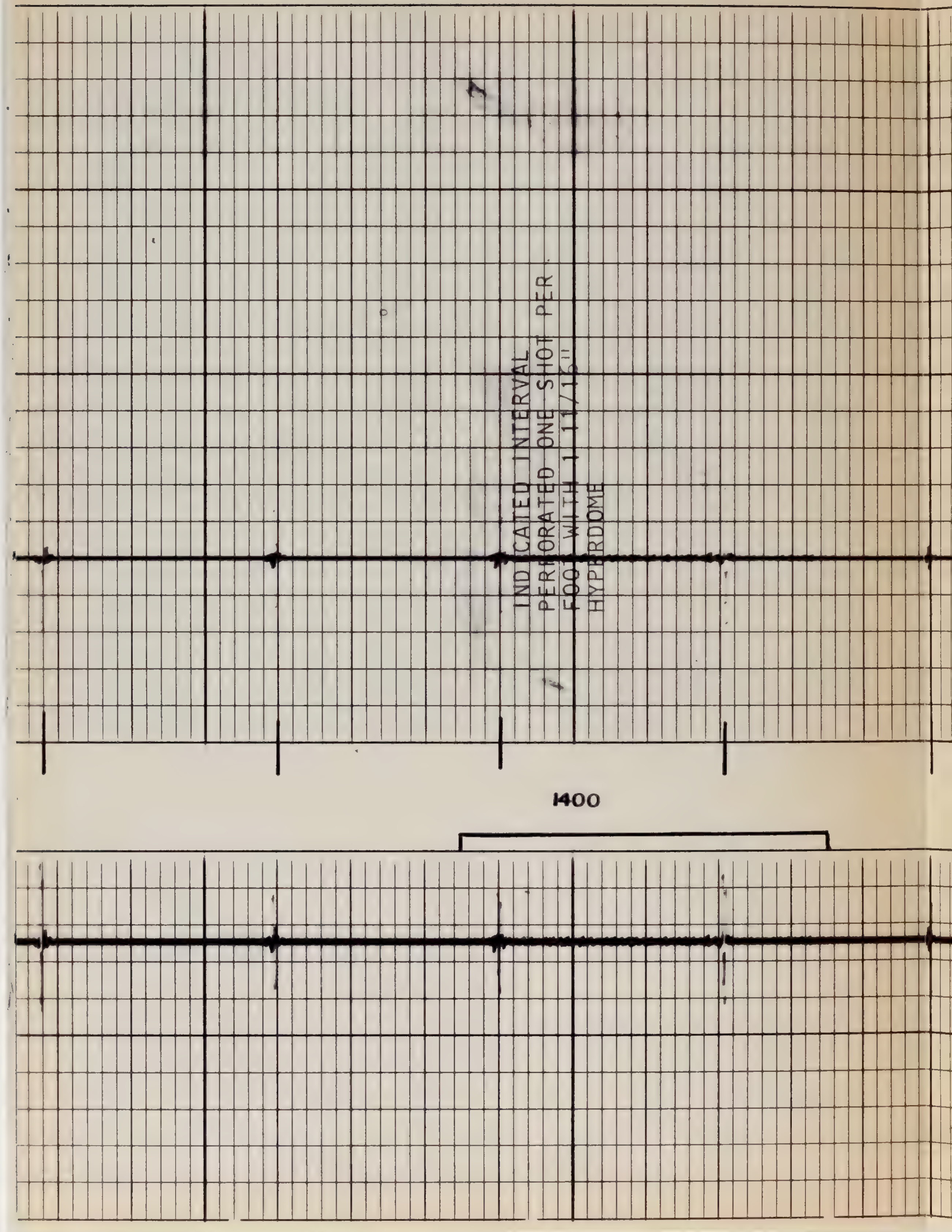
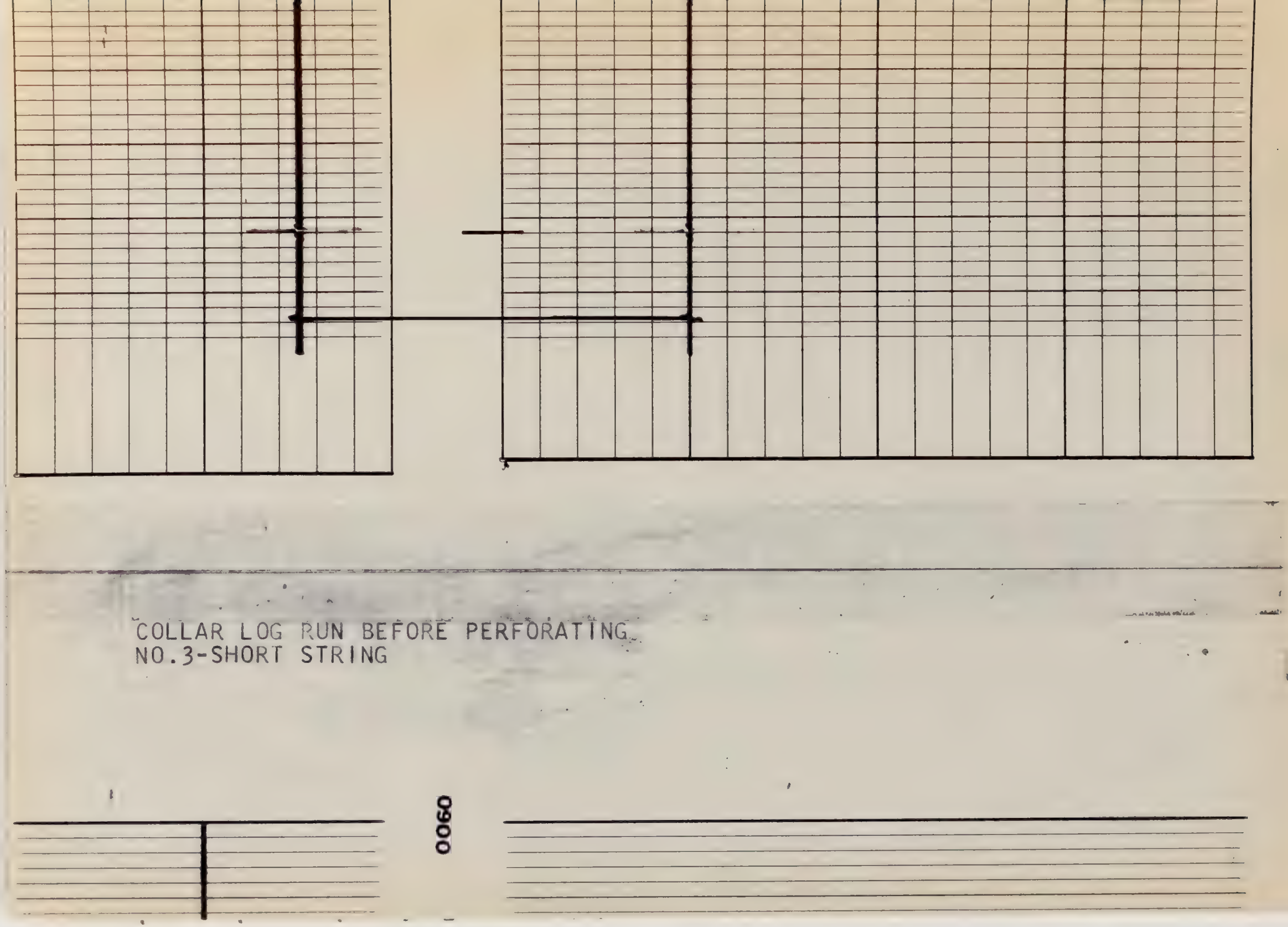
COLLAR LOG RUN AFTER PERFORATING
NO.2-MIDDLE STRING

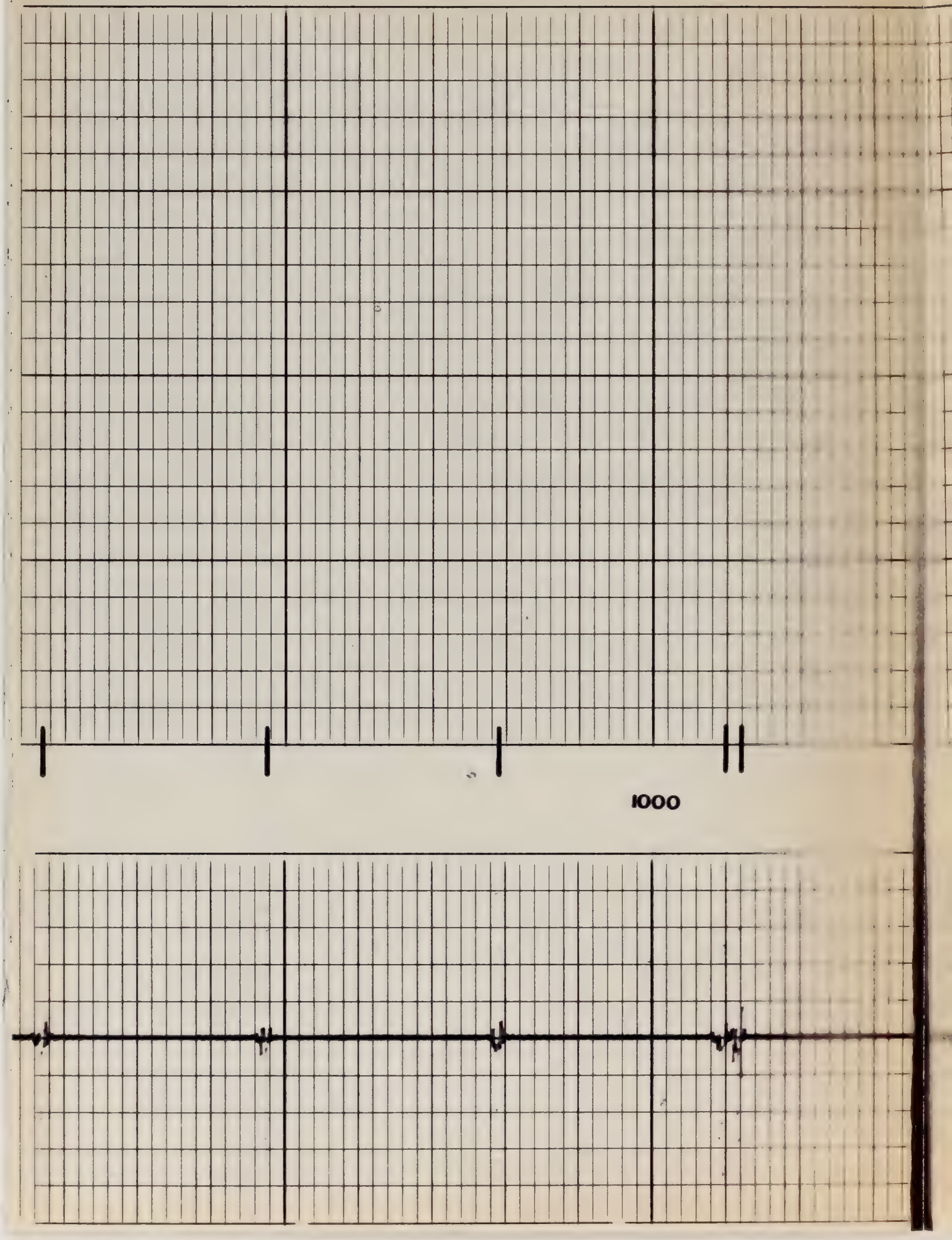

1100
1200

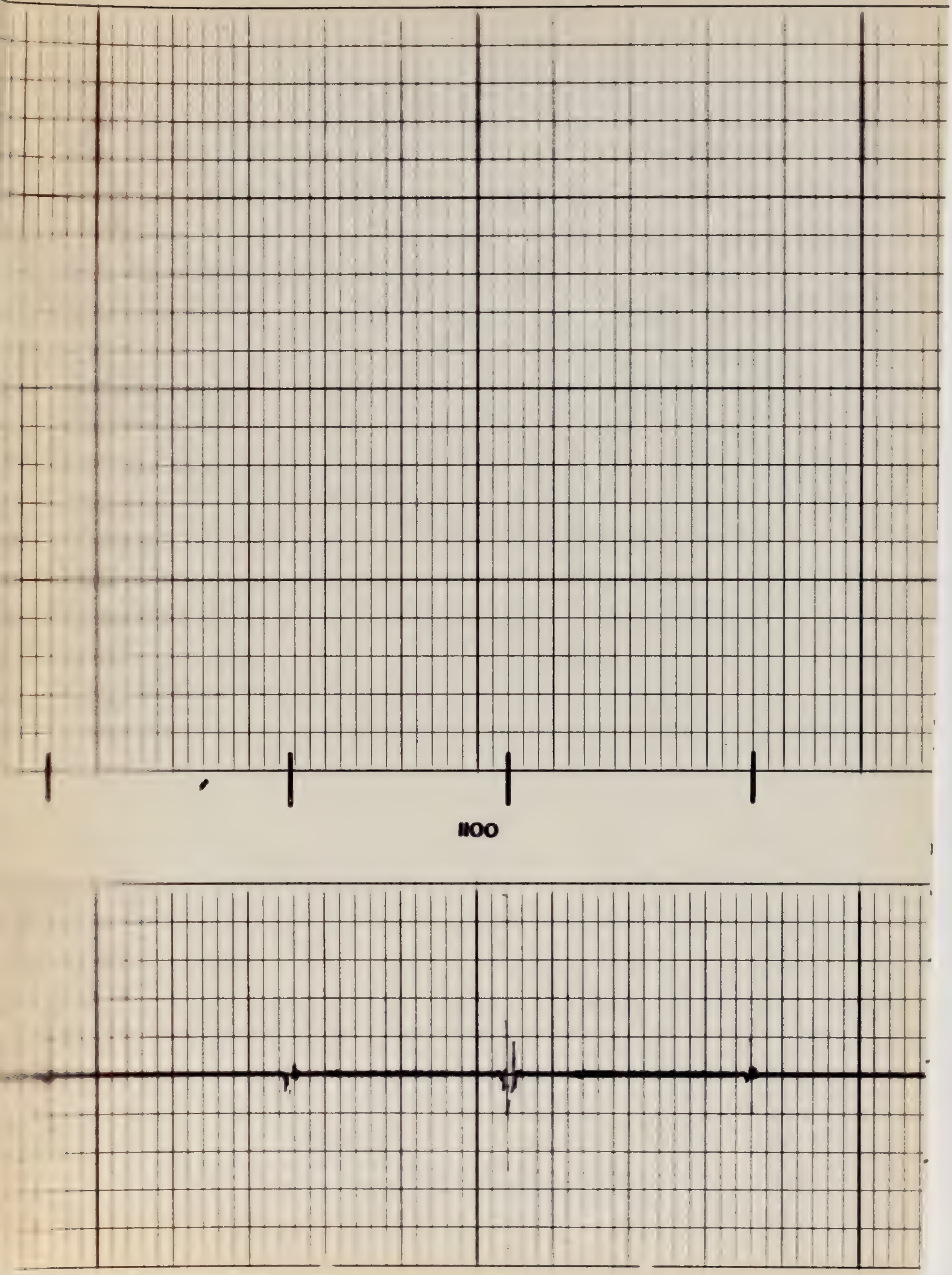

0
1300

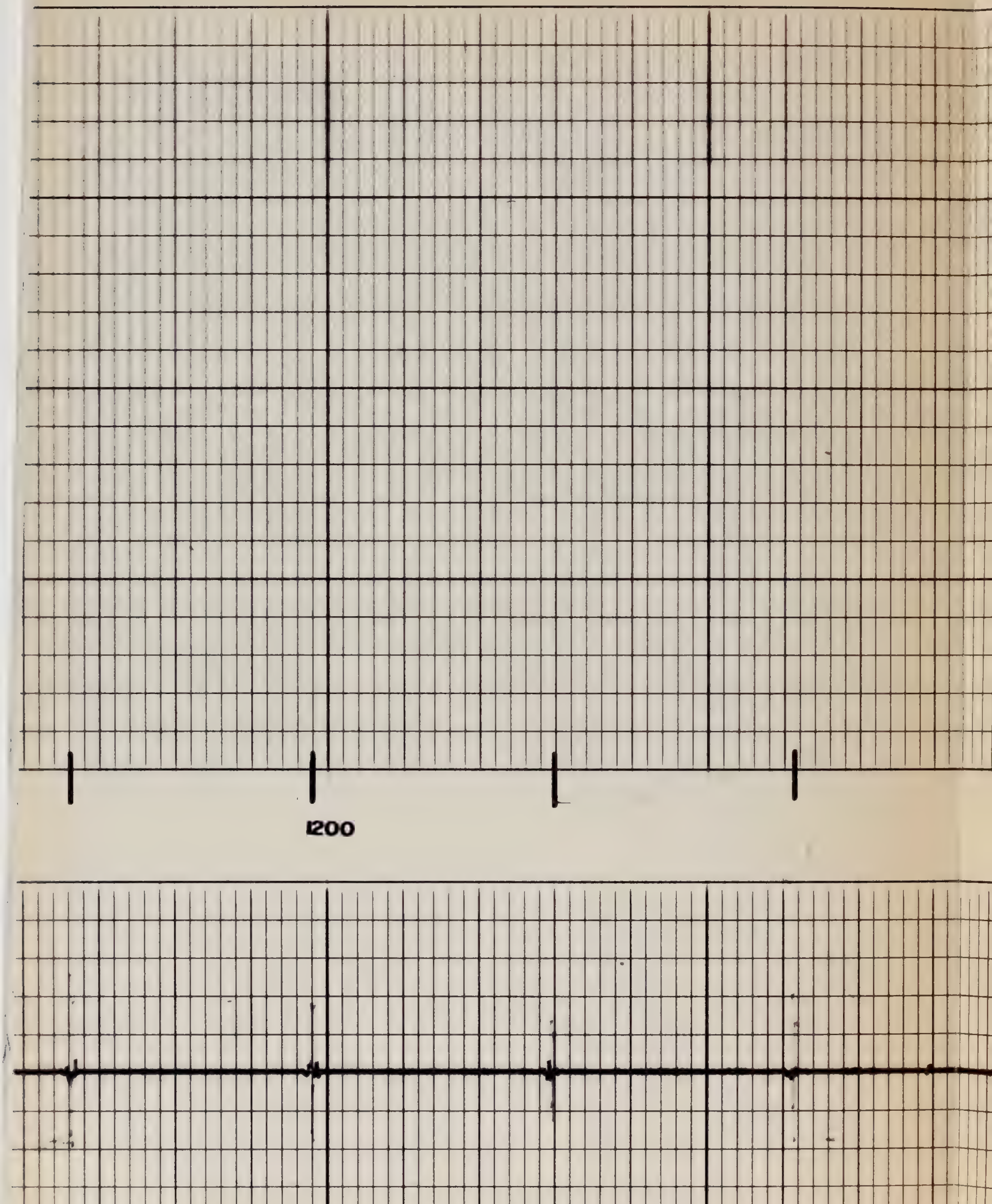

INDICATED INTERVAL
PERFORATED ONE SHOT PER
FOOT WITH 1 11/16"
HYPERDOME
1400

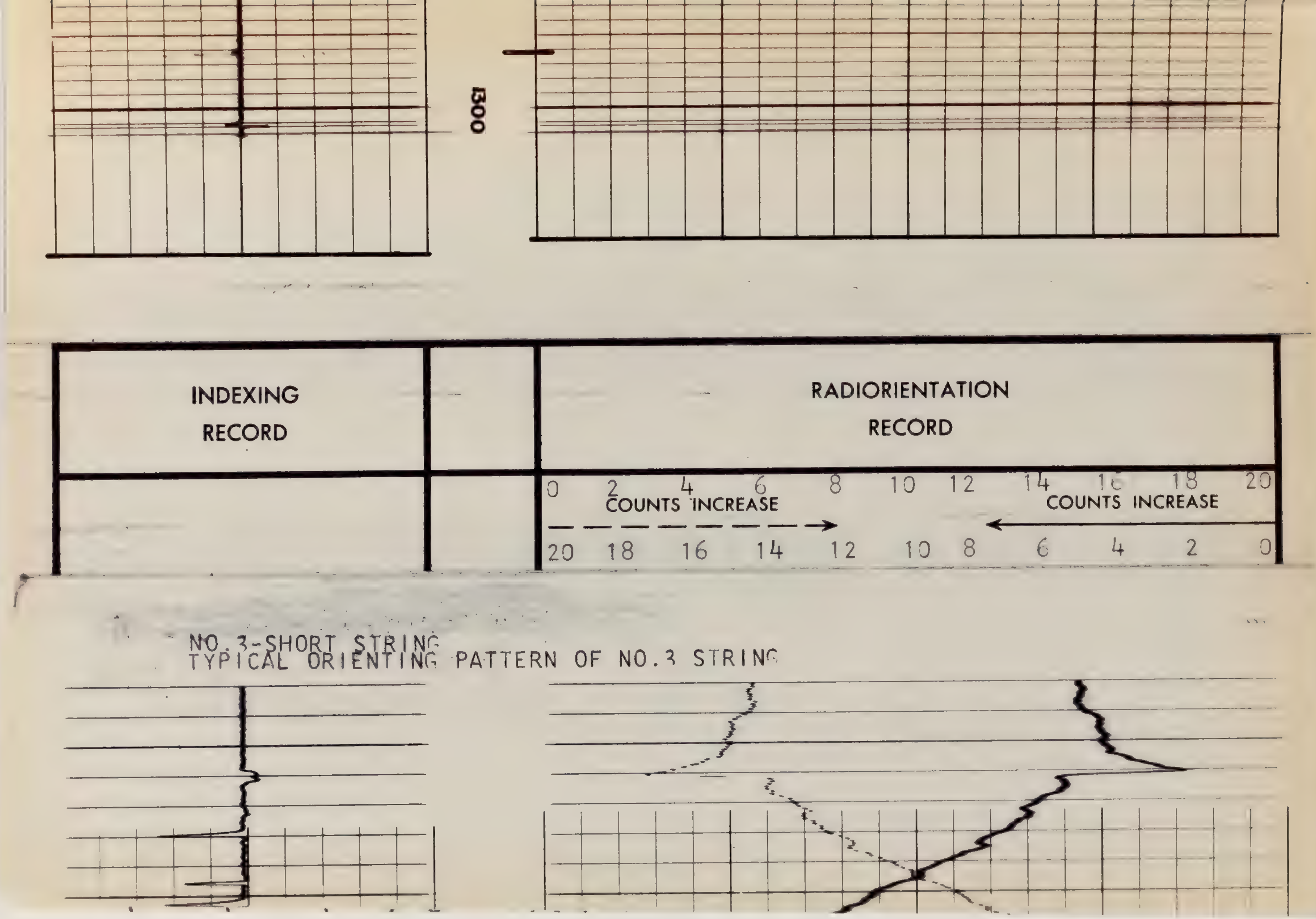


COLLAR LOG RUN BEFORE PERFORATING
NO.3-SHORT STRING

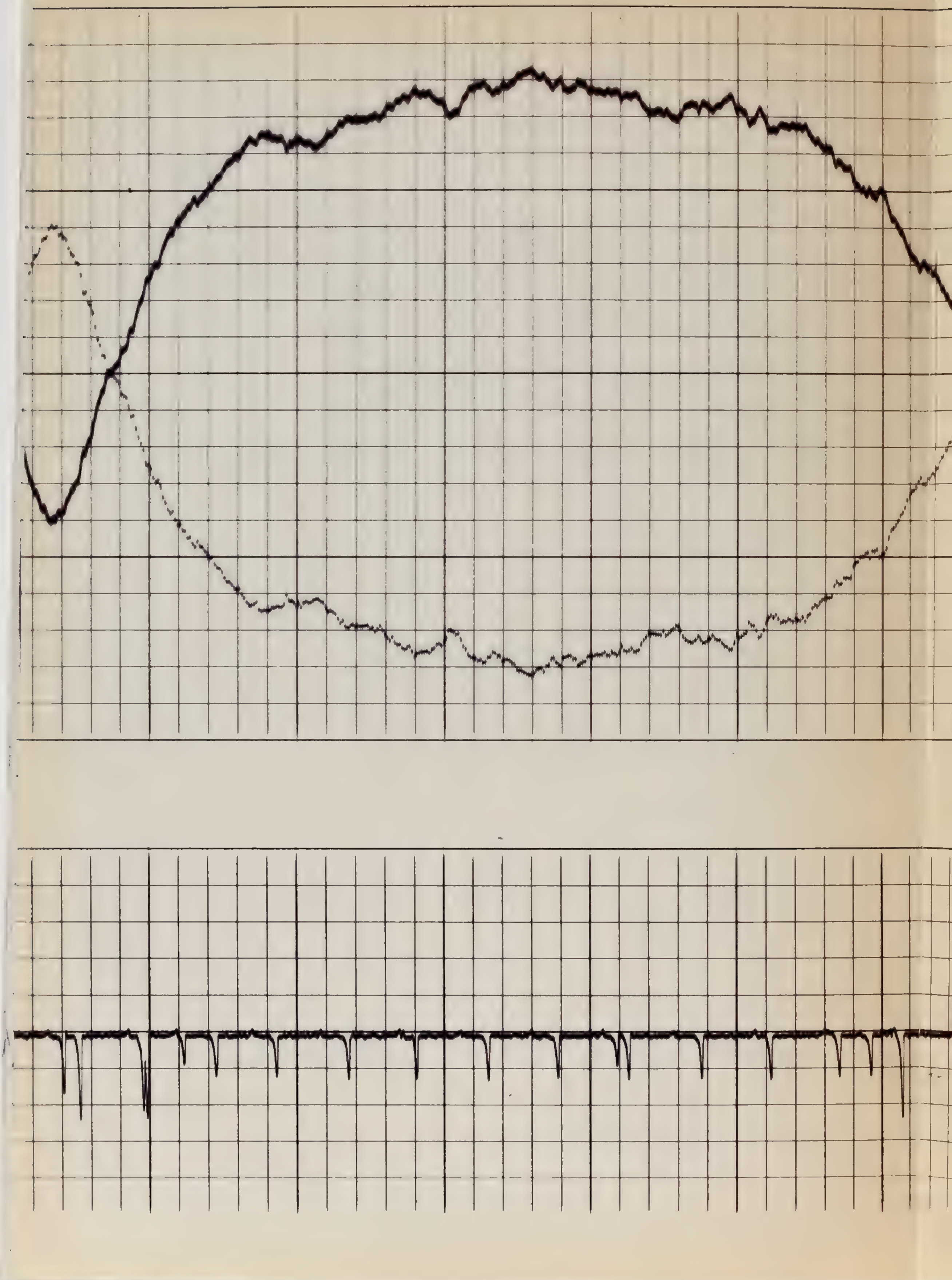

1000

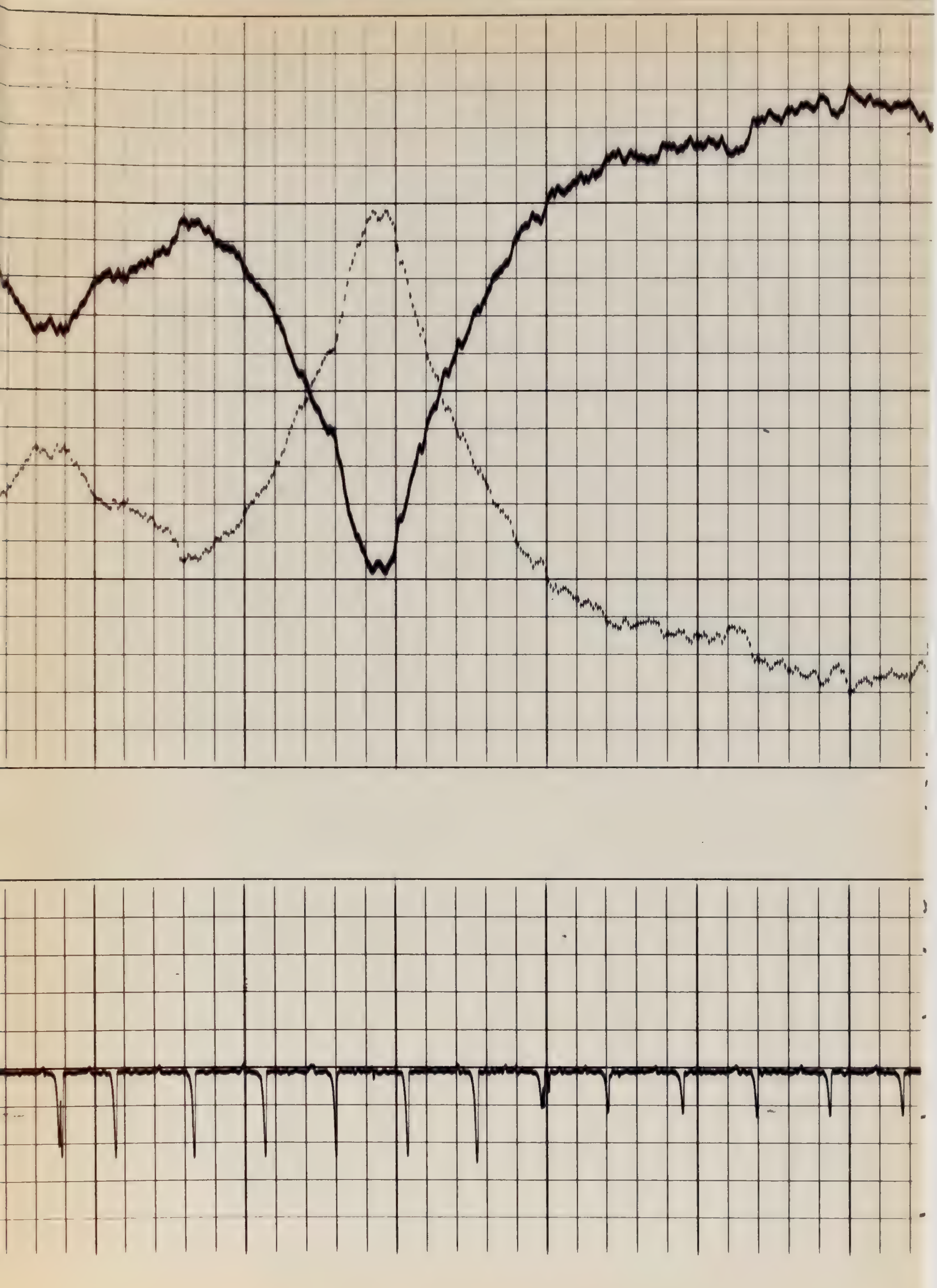

1100

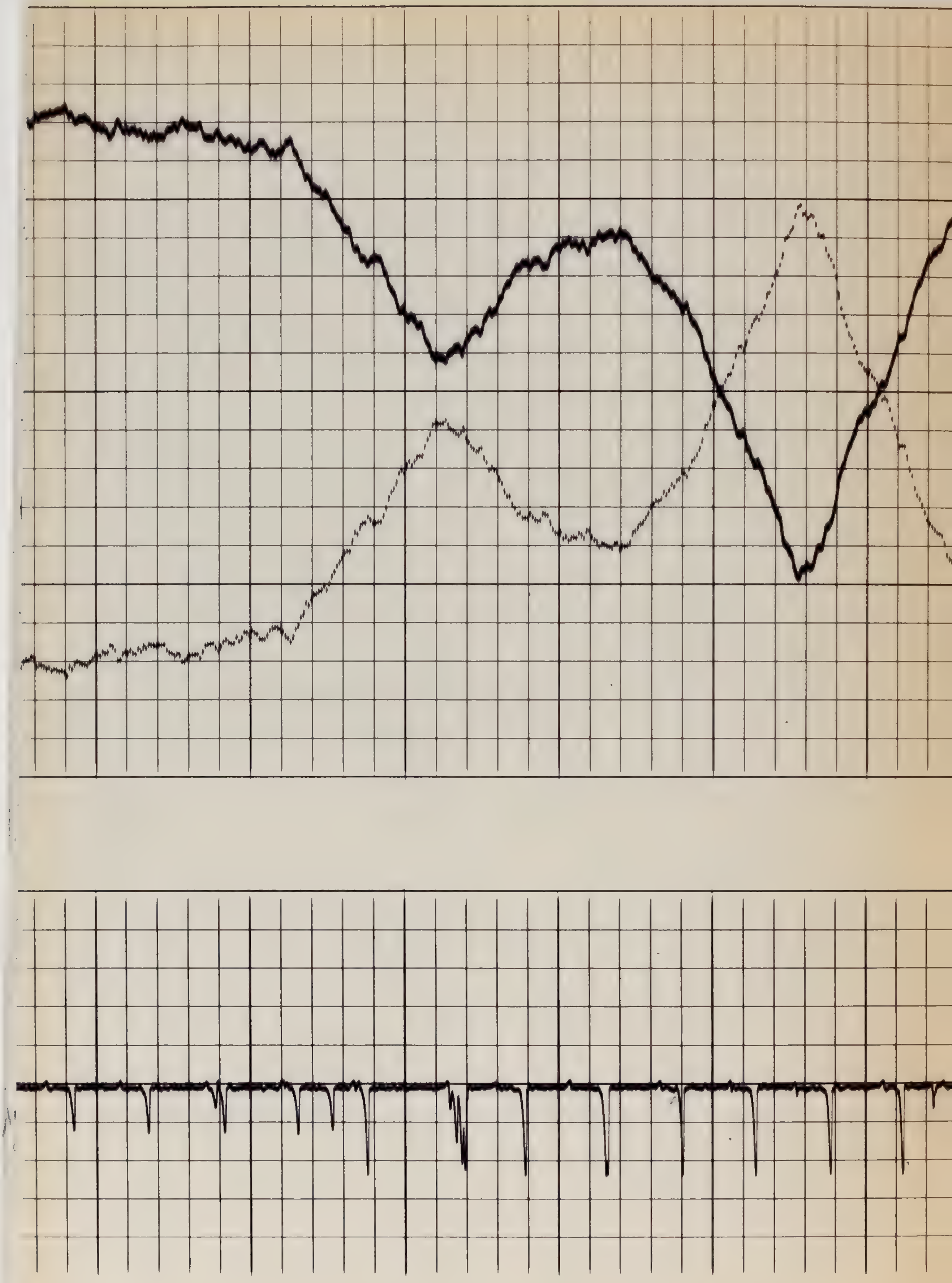

1200

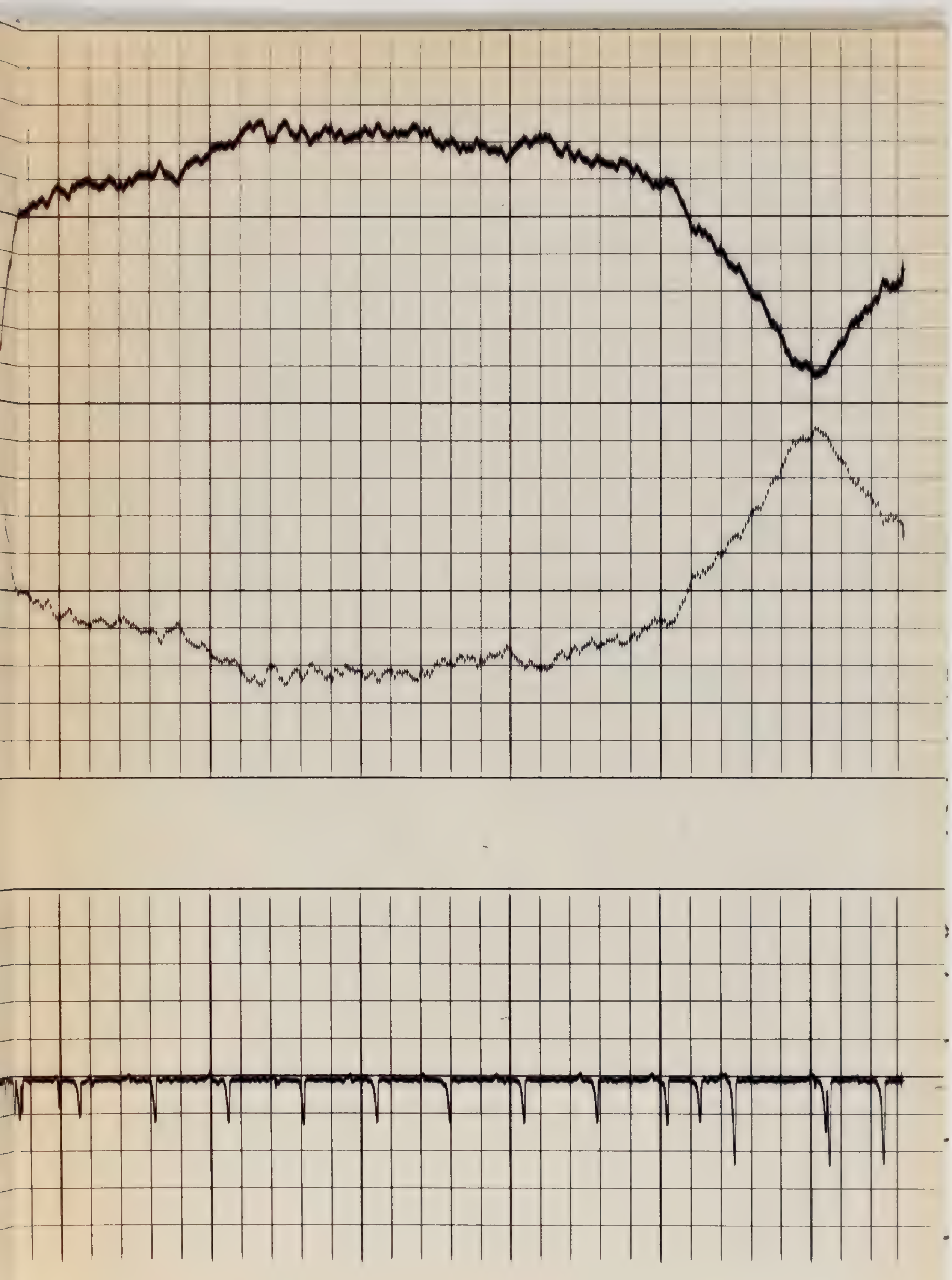


NO.3-SHORT STRING
TYPICAL ORIENTING PATTERN OF NO.3 STRING





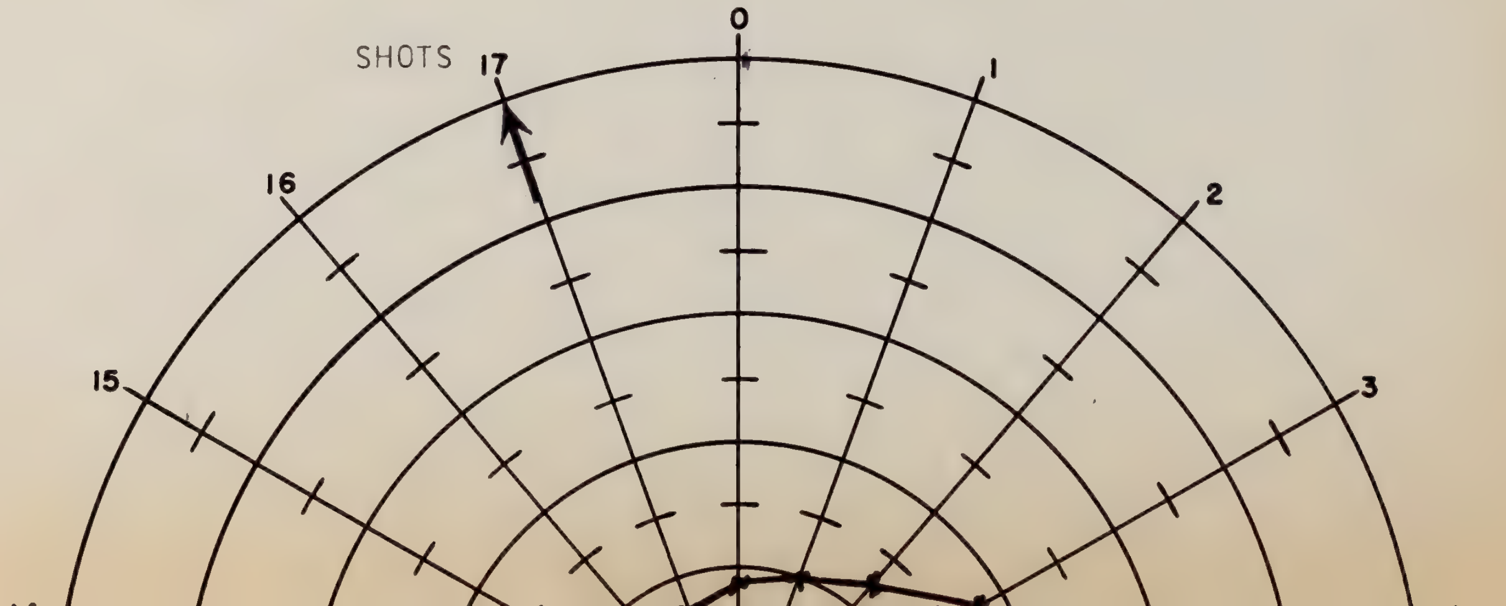


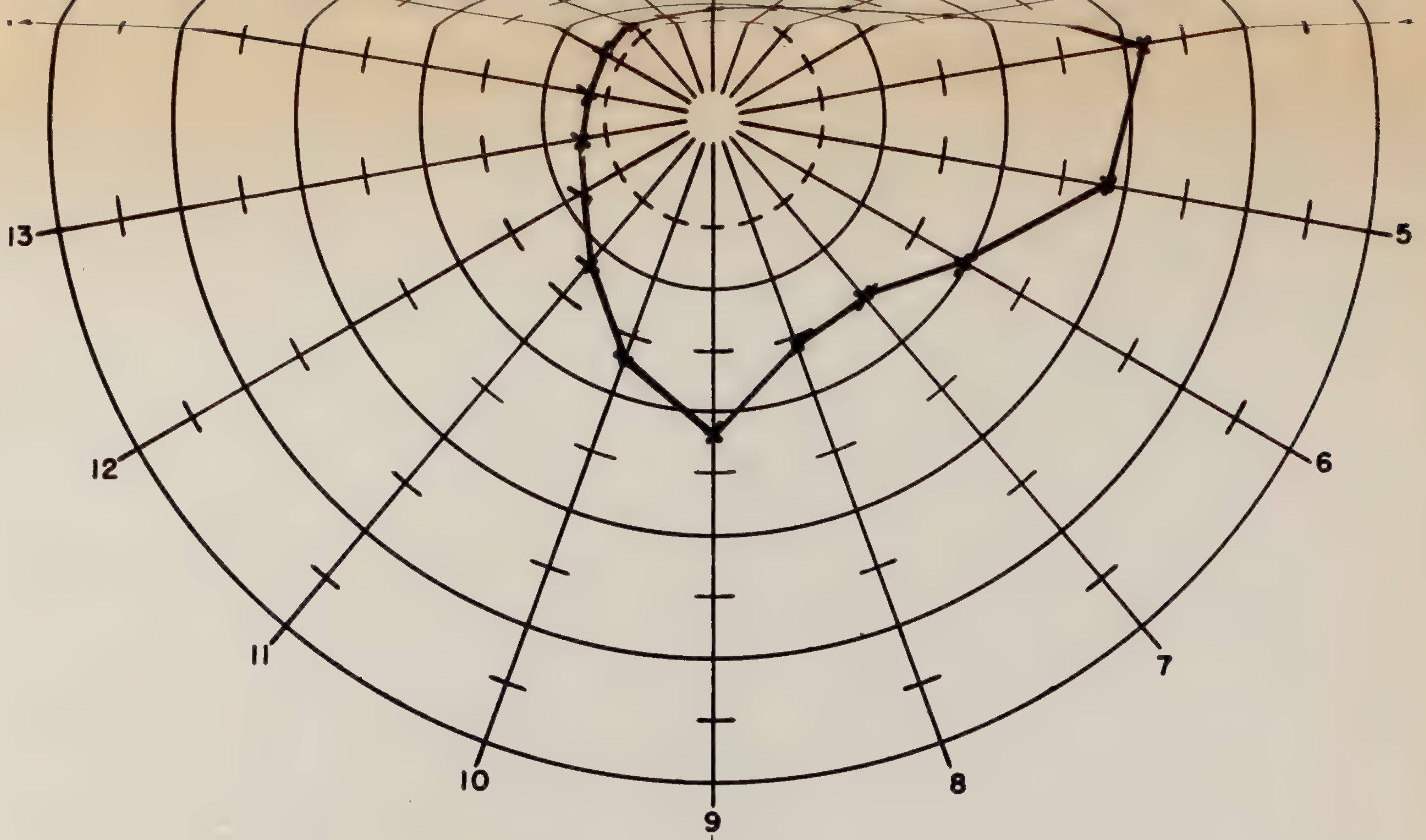


RADIORIENTATION PLOT

POT-B

NO.3-SHORT STRING PERFORATED 1280-1290 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





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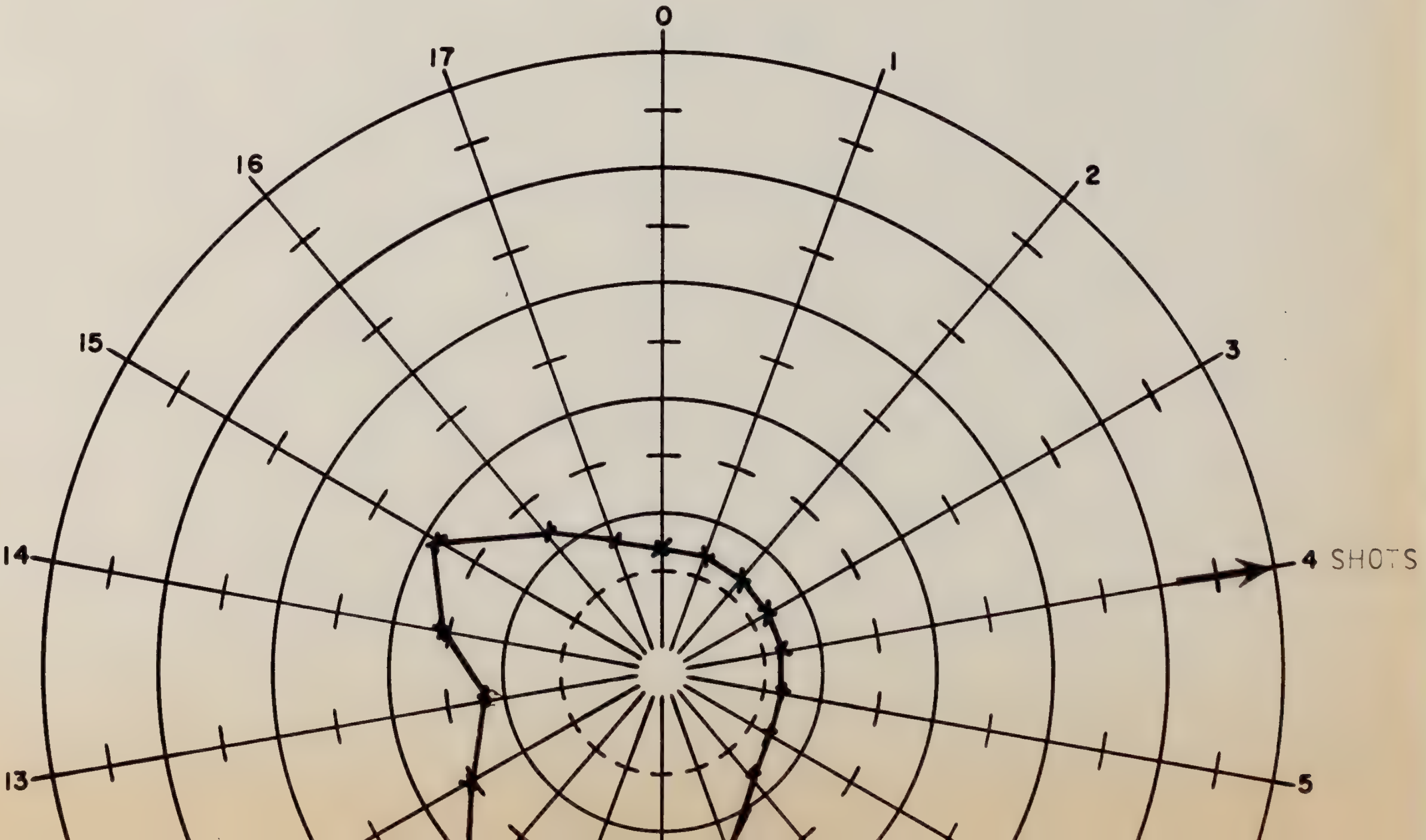
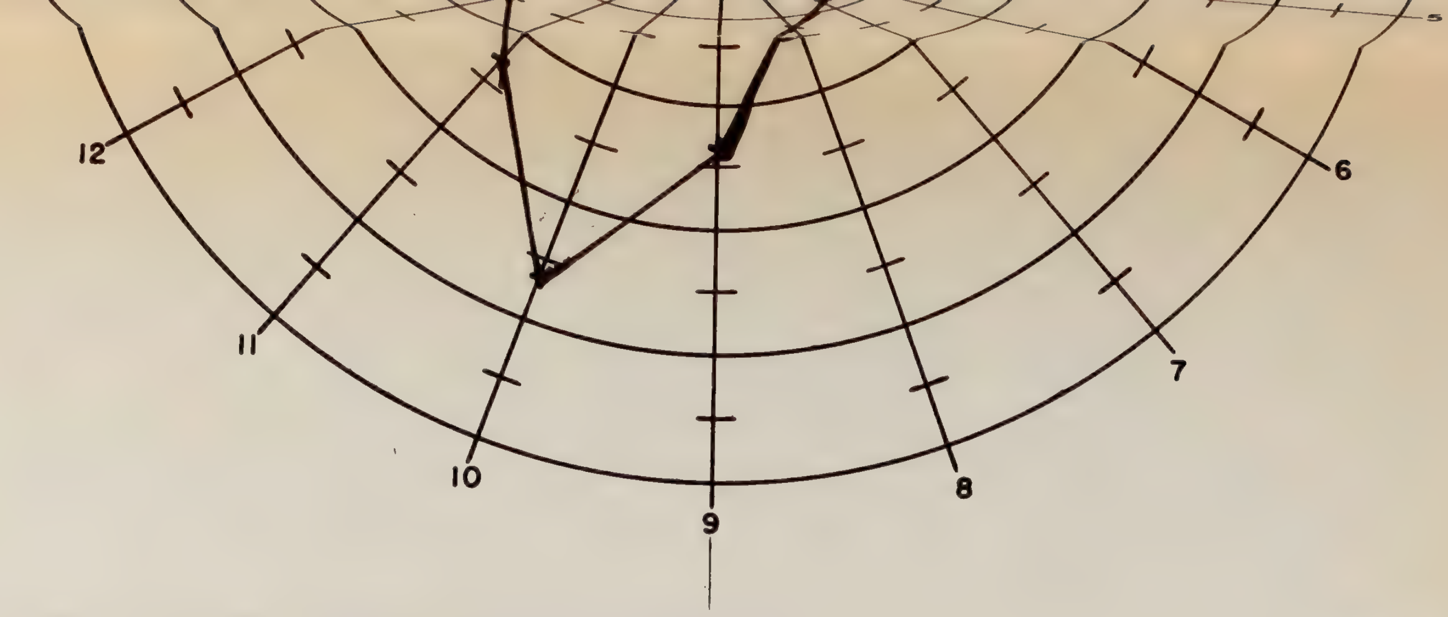
RADIORIENTATION PLOT

POT-B

NO. 3-SHORT STRING PERFORATED 1269-1279 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





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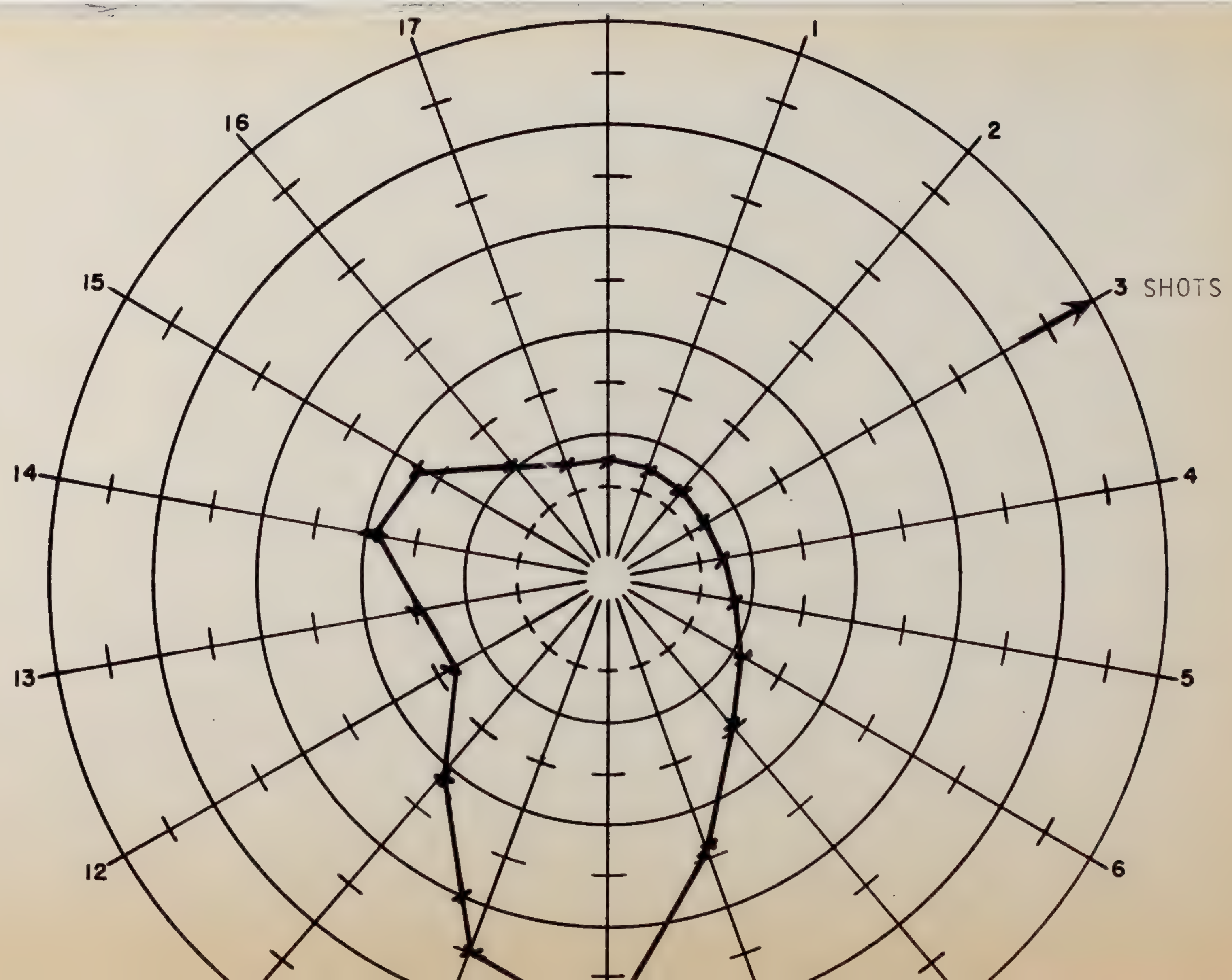
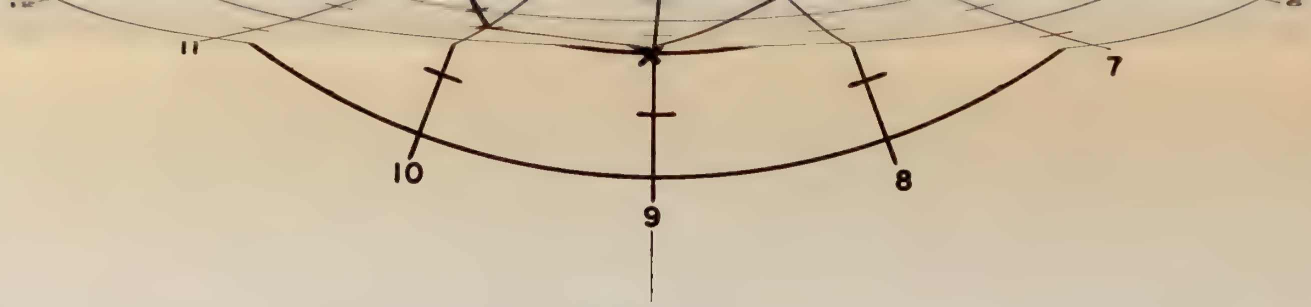
RADIORIENTATION PLOT

POT-B

NO.3-SHORT STRING PERFORATED 1258-1268 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME


17
1
16
2
15
3 SHOTS
14
4
13
5
12
6



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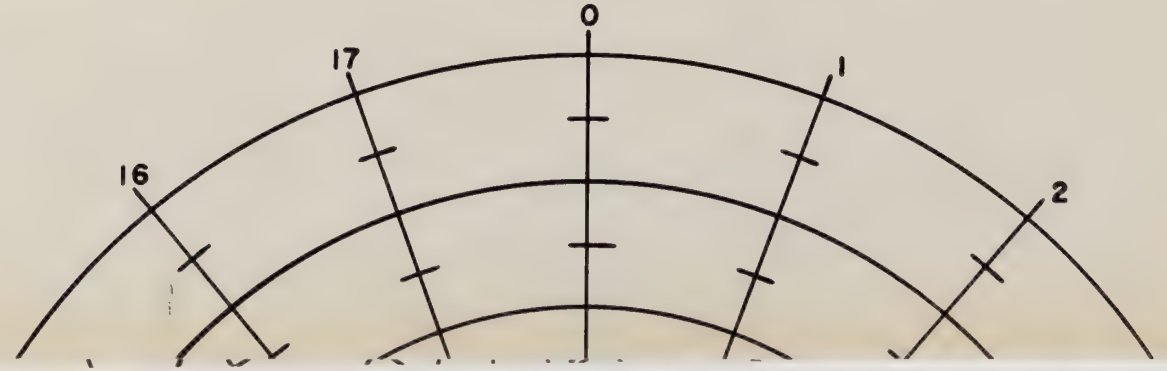
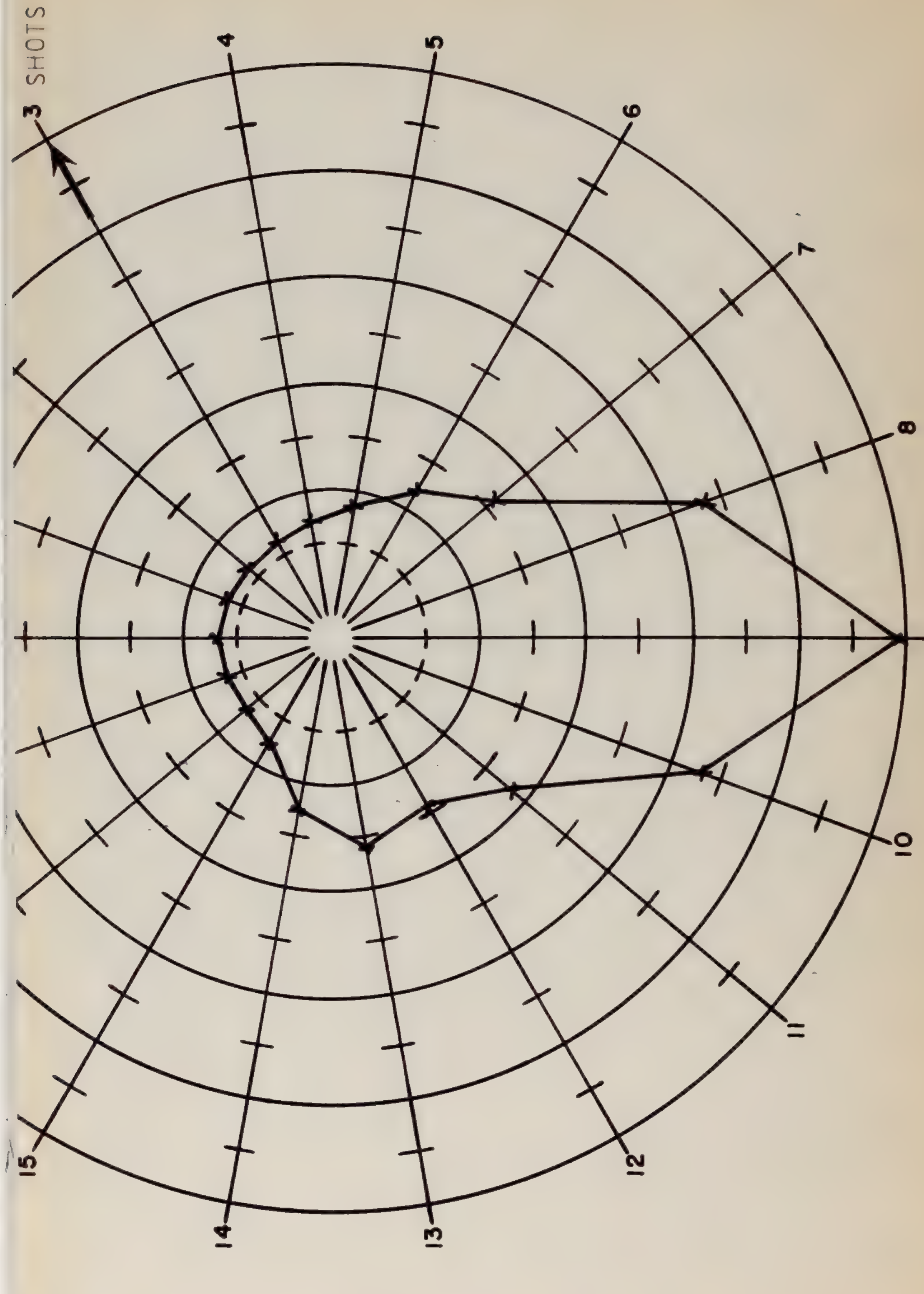
RADIORIENTATION PLOT

POT-B

NO.3-SHORT STRING PERFORATED 1247-1257 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME




3 SHOTS
4
5
6
7
8
9
10
11
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14
15

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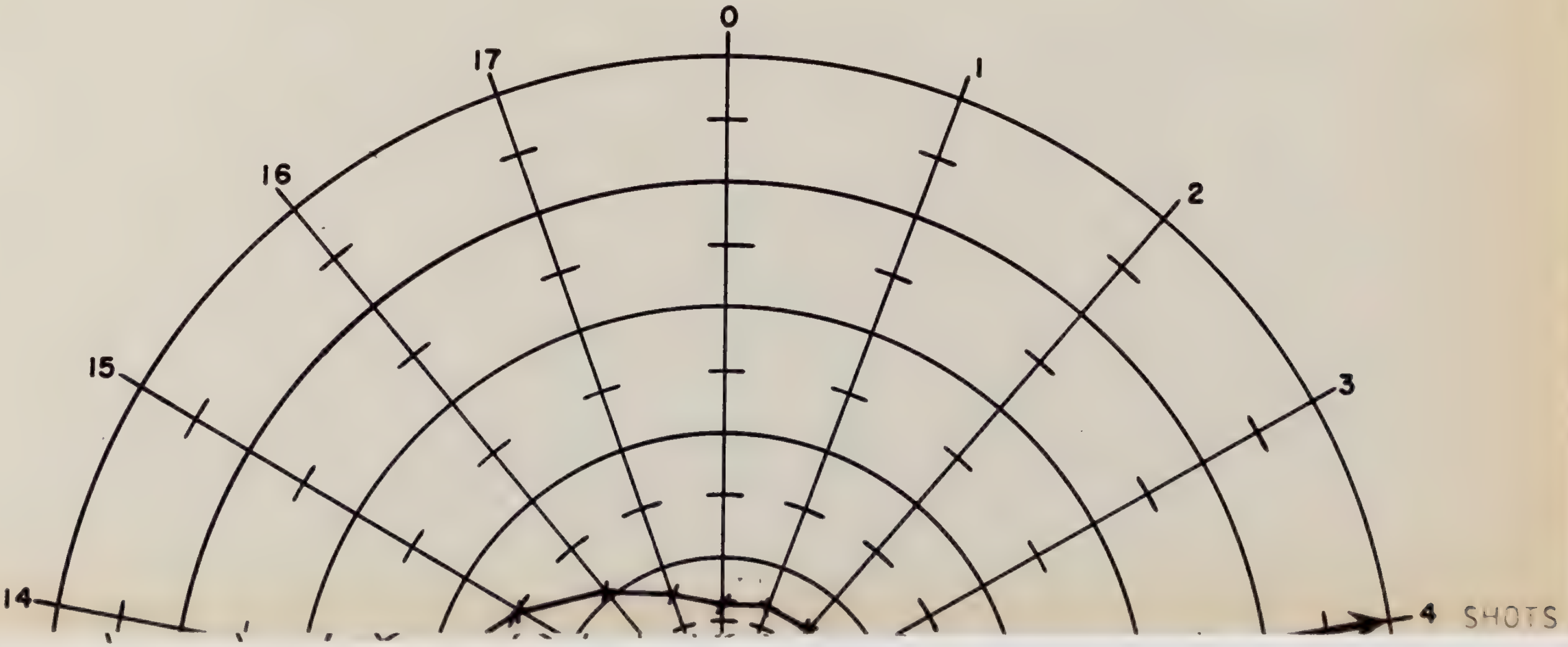
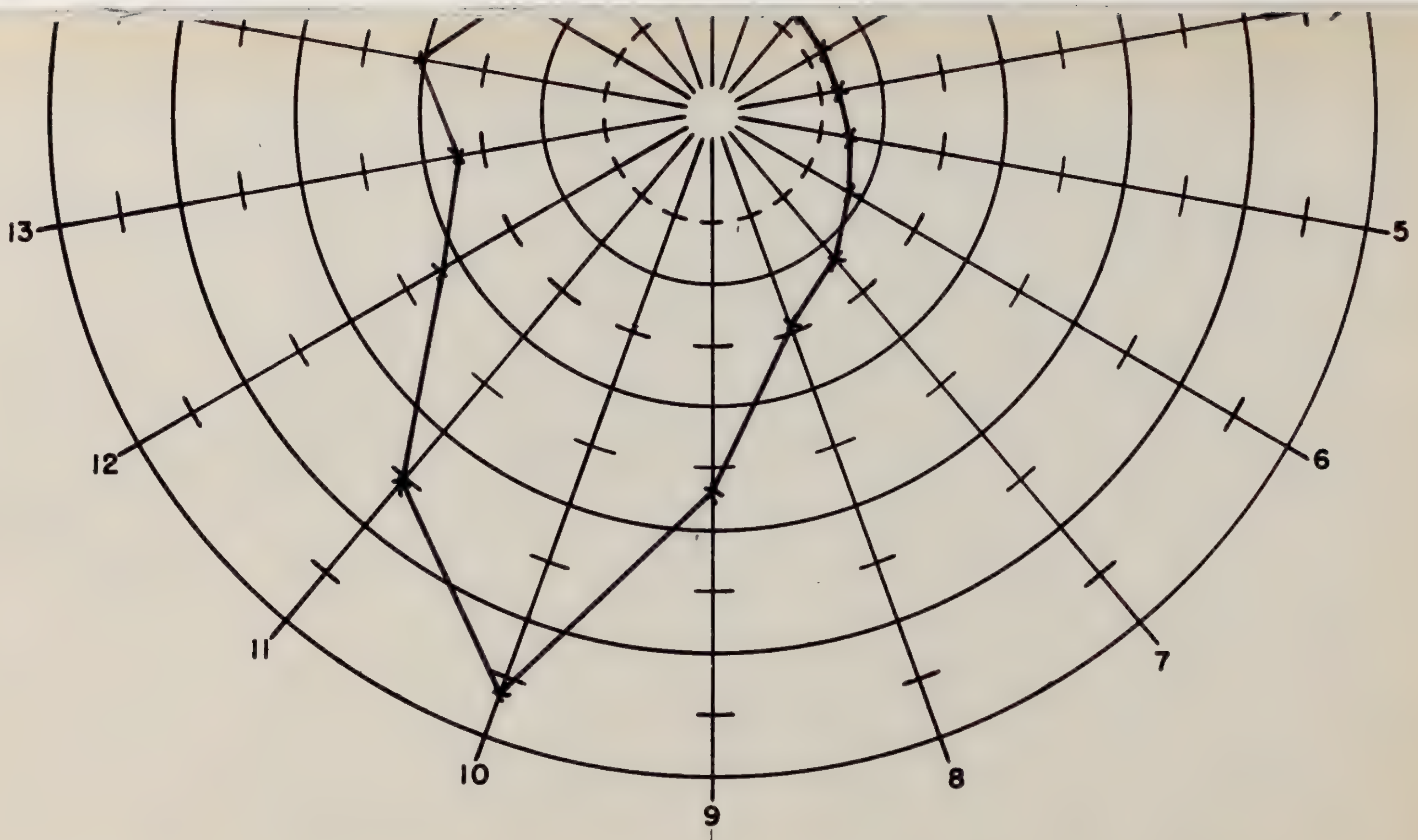
RADIORIENTATION PLOT

POT-B

NO.3-SHORT STRING PERFORATED 1236-1246 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





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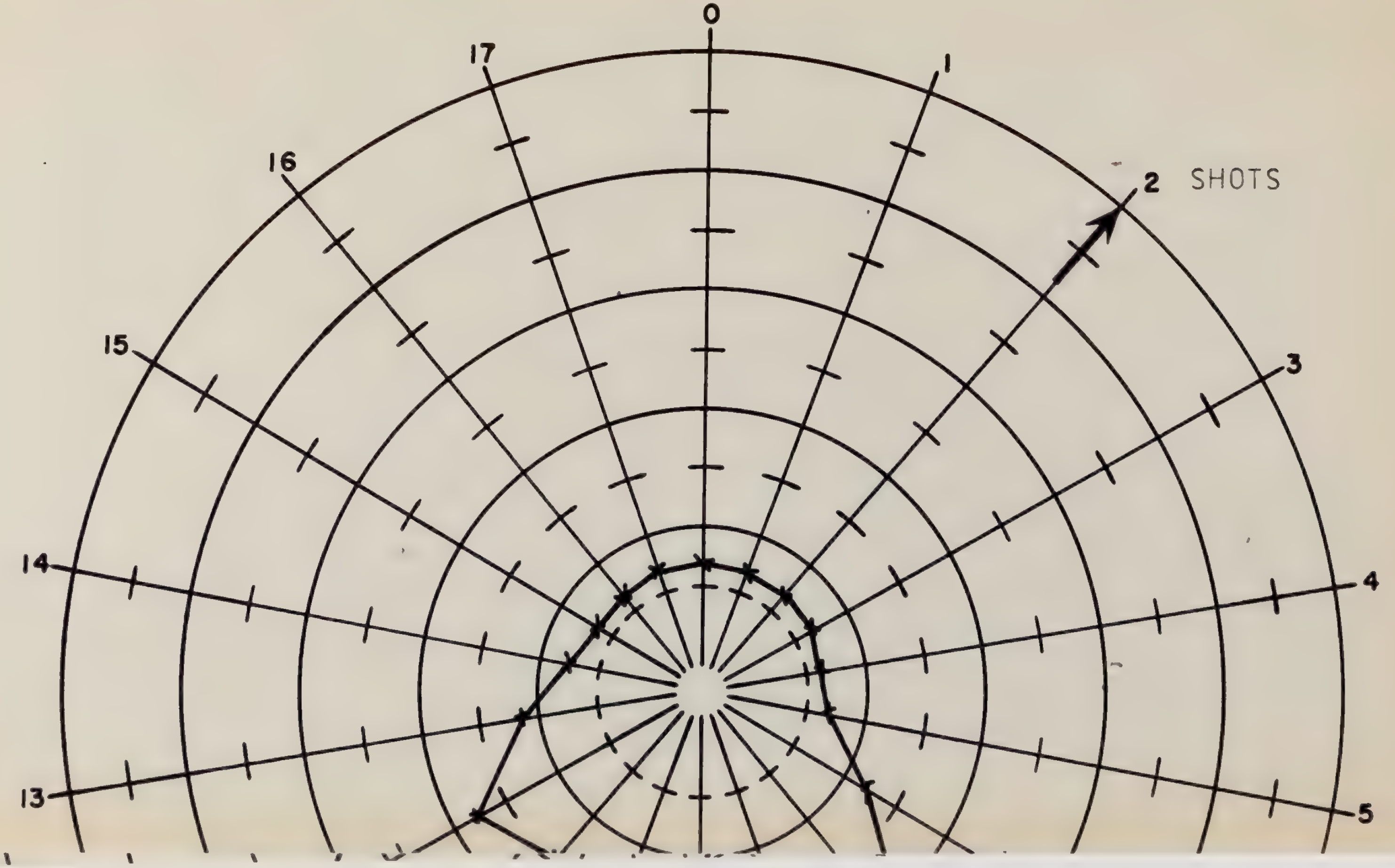
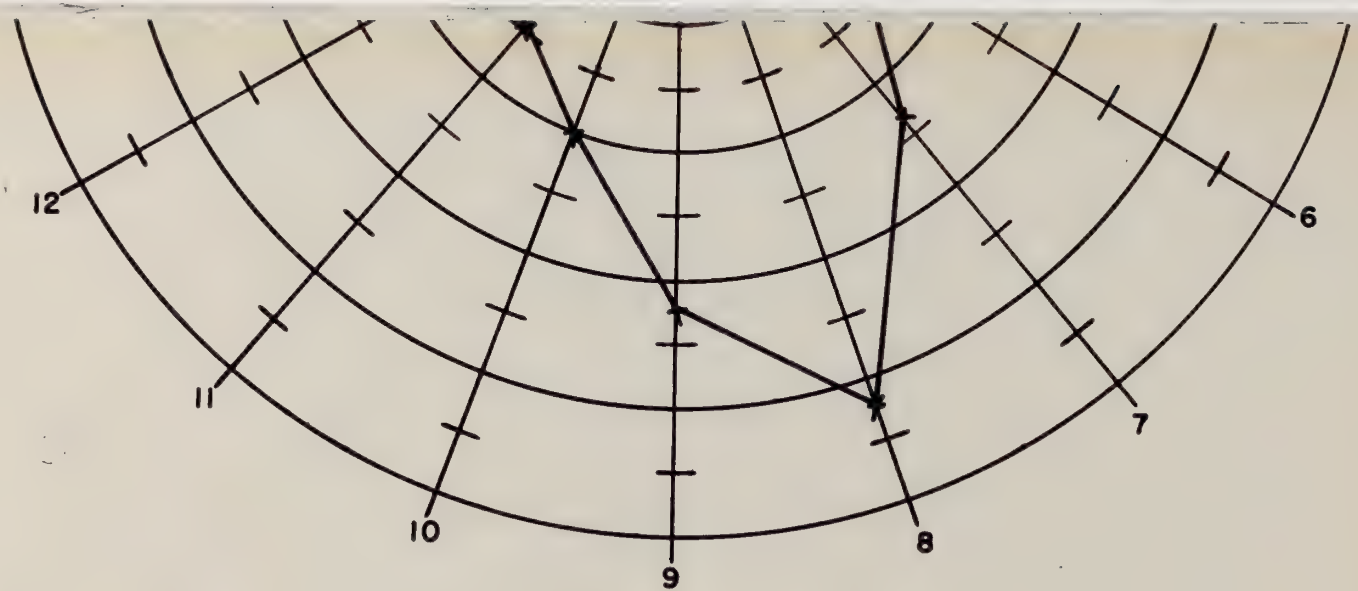
RADIORIENTATION PLOT

POT-B

NO.3-SHORT STRING PERFORATED 1225-1235 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





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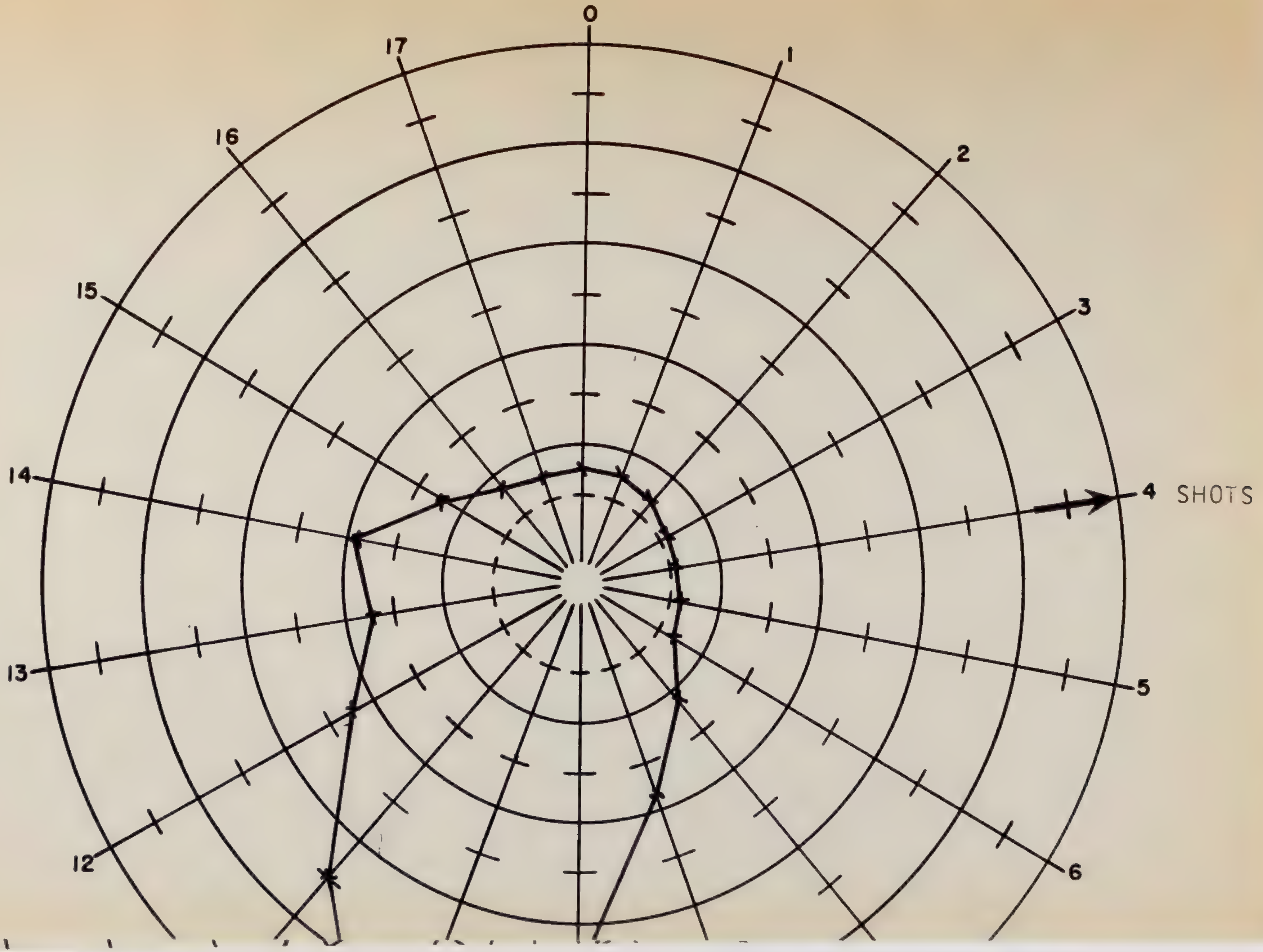
RADIORIENTATION PLOT

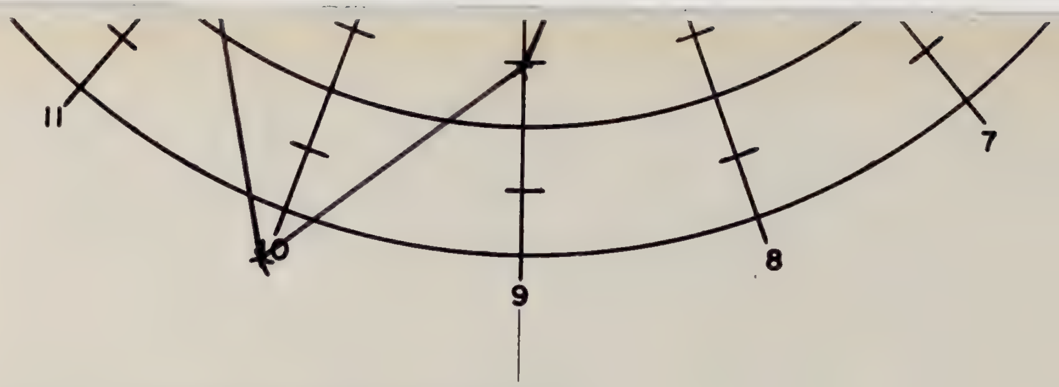
POT-B

RADIORIENTATION PLOT

POT-B

[illegible] 3 SHORT STRING PERFORATED 1214 1224 ONE SHOT PER FOOT WITH [illegible]





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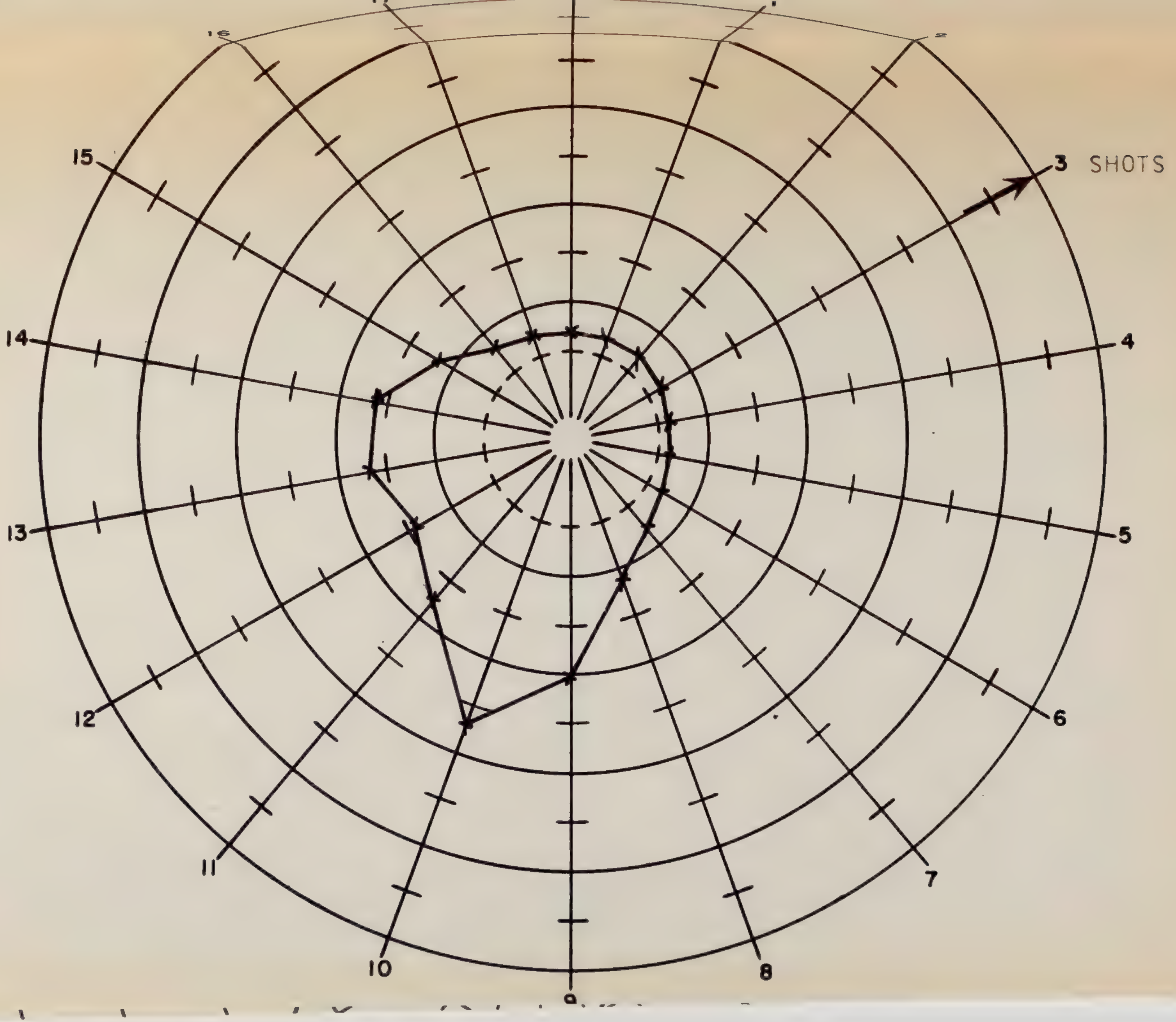
RADIORIENTATION PLOT

POT-B

NO.3-SHORT STRING PERFORATED 1203-1213 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME


16
1
2
3 SHOTS
4
5
6
7
8
9
10
11
12
13
14
15

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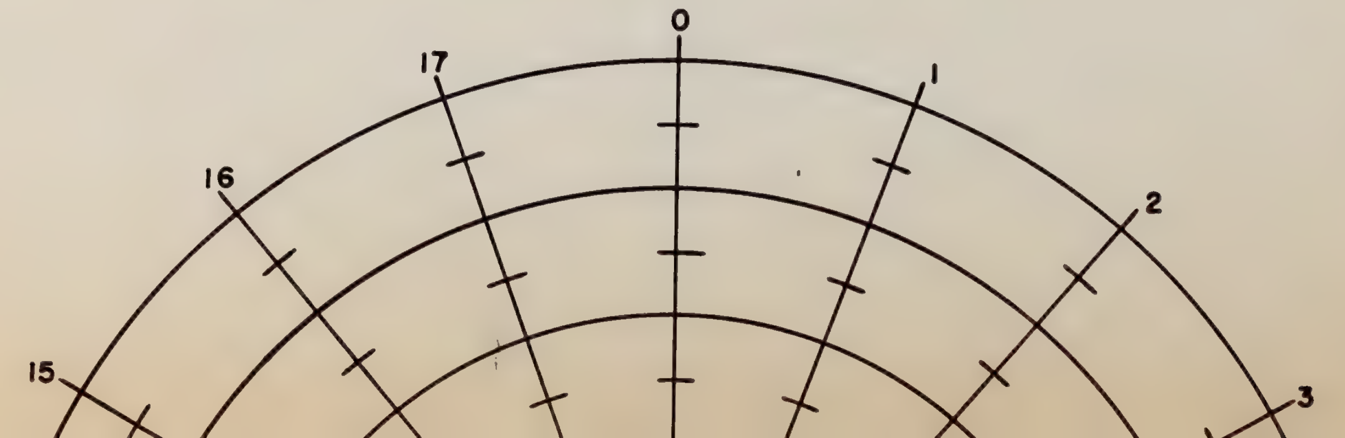
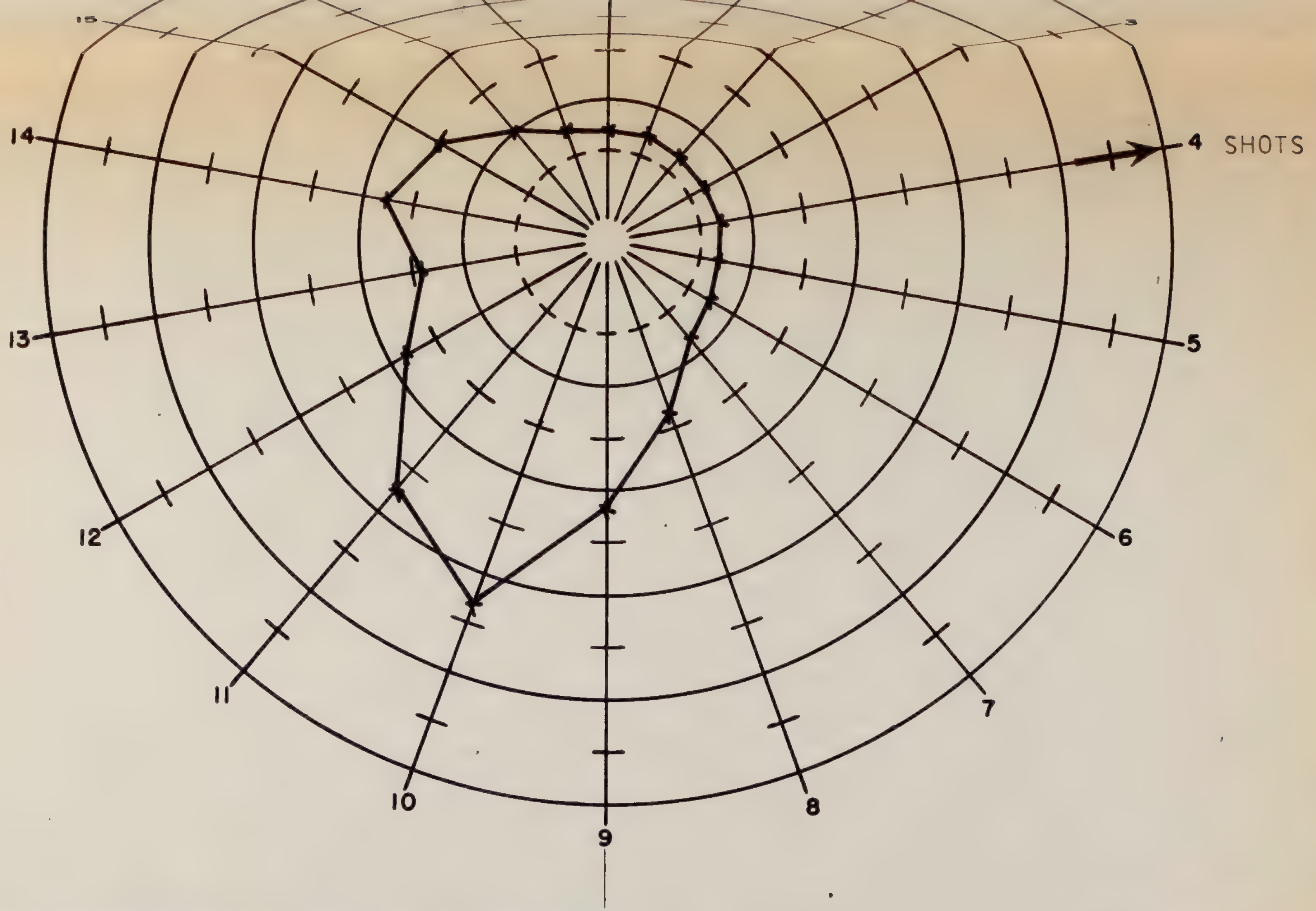
RADIORIENTATION PLOT

POT-B

NO.3-SHORT STRING PERFORATED 1199-1202 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





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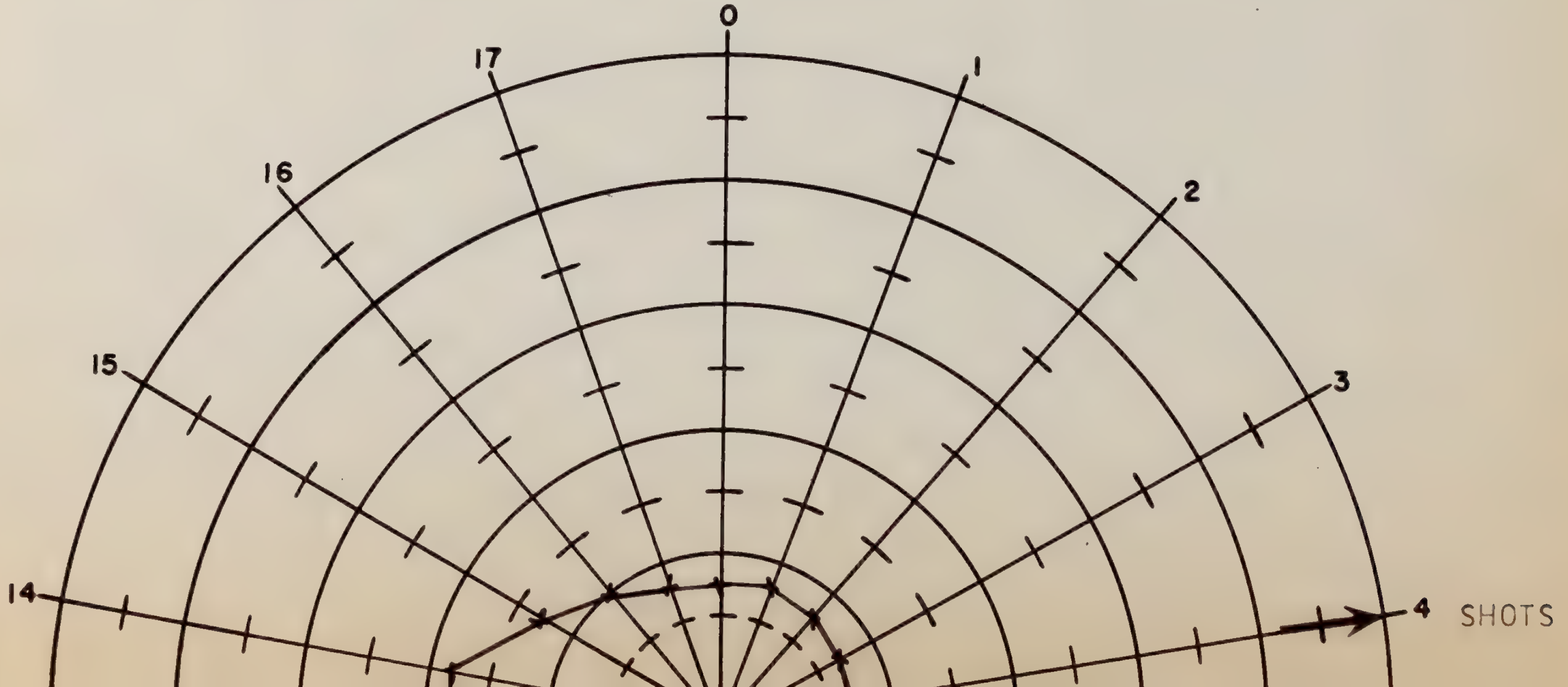
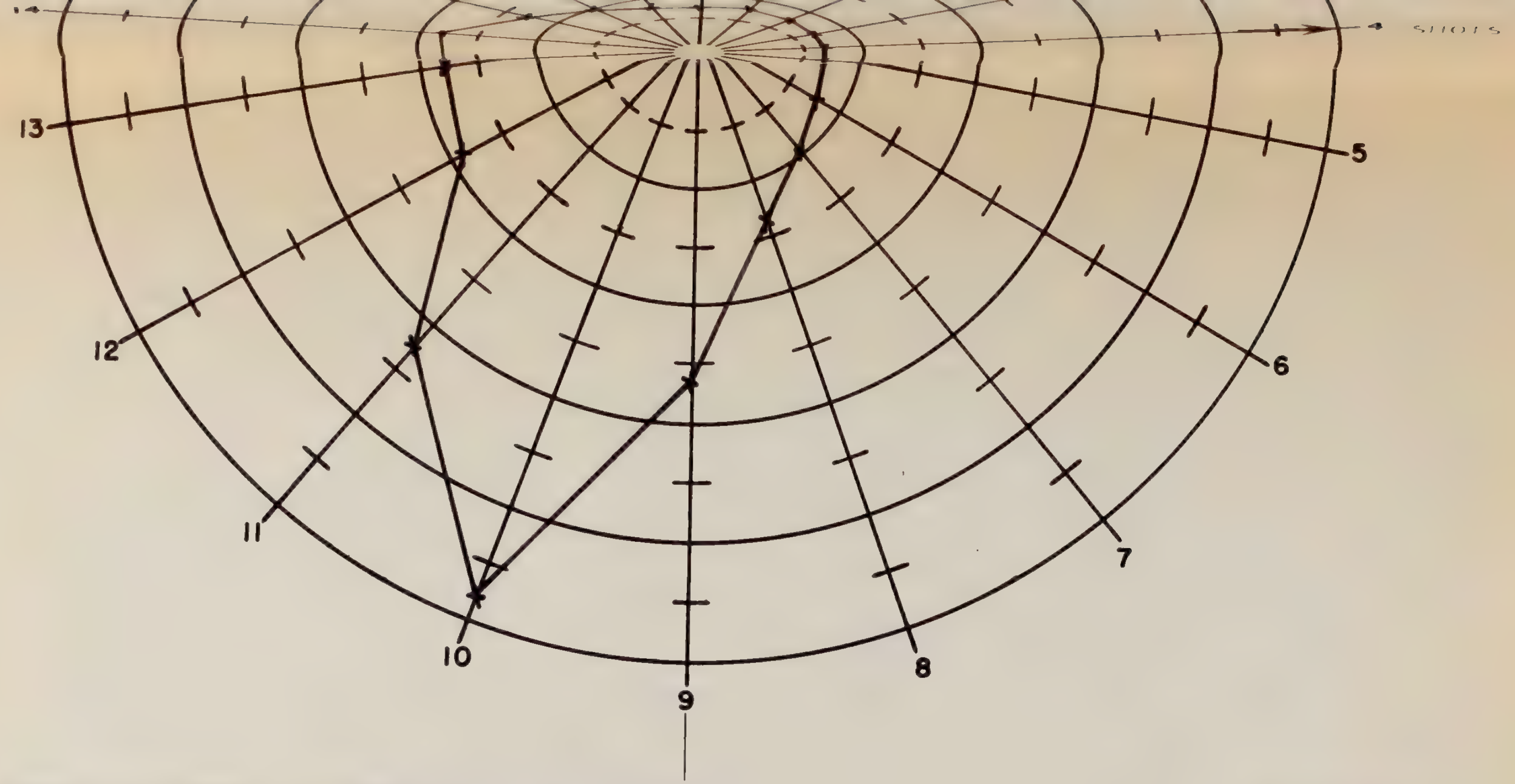
Schlumberger

RADIORIENTATION PLOT

POT-B

NO.3-SHORT STRING-PERFORATED 1188-1198 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





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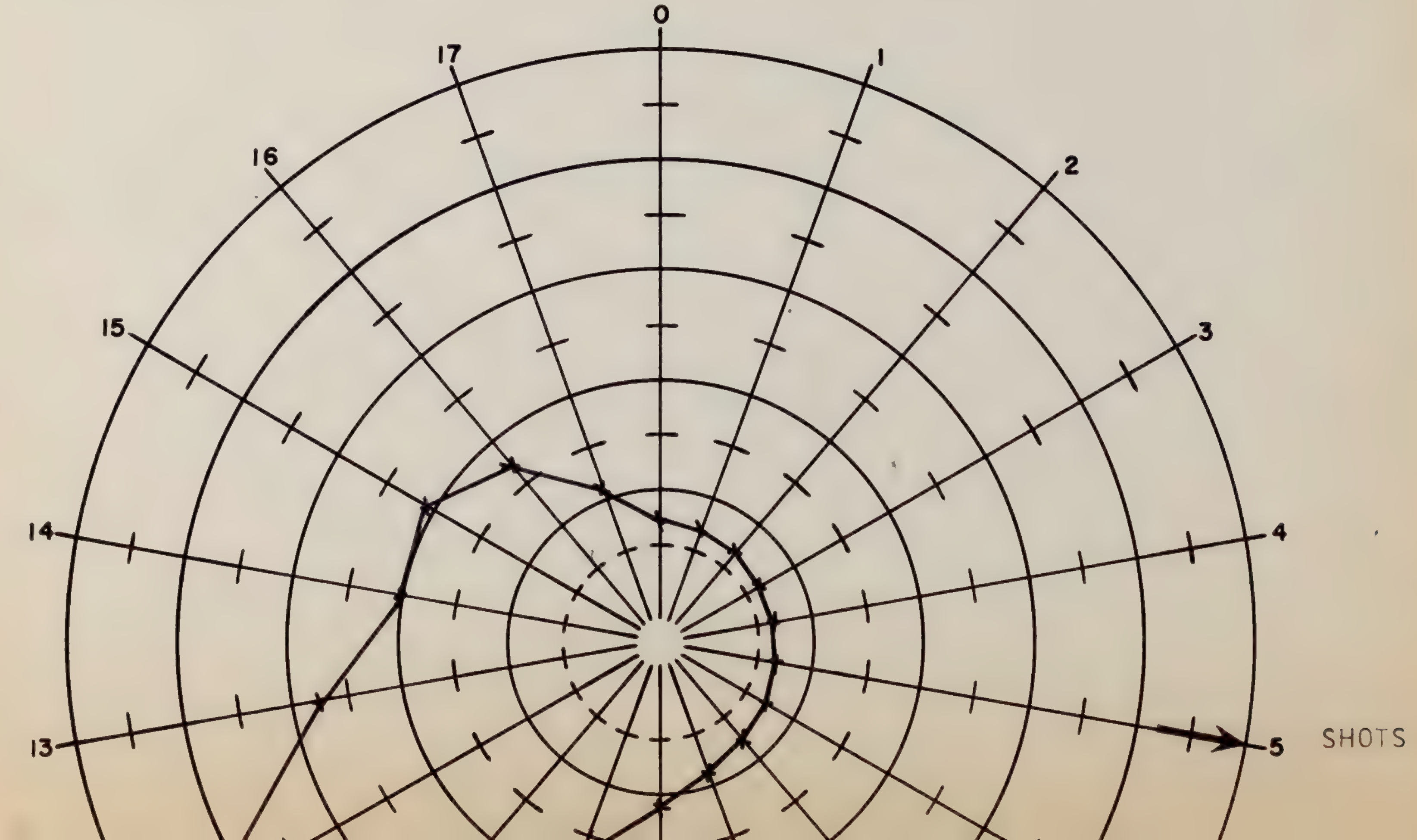
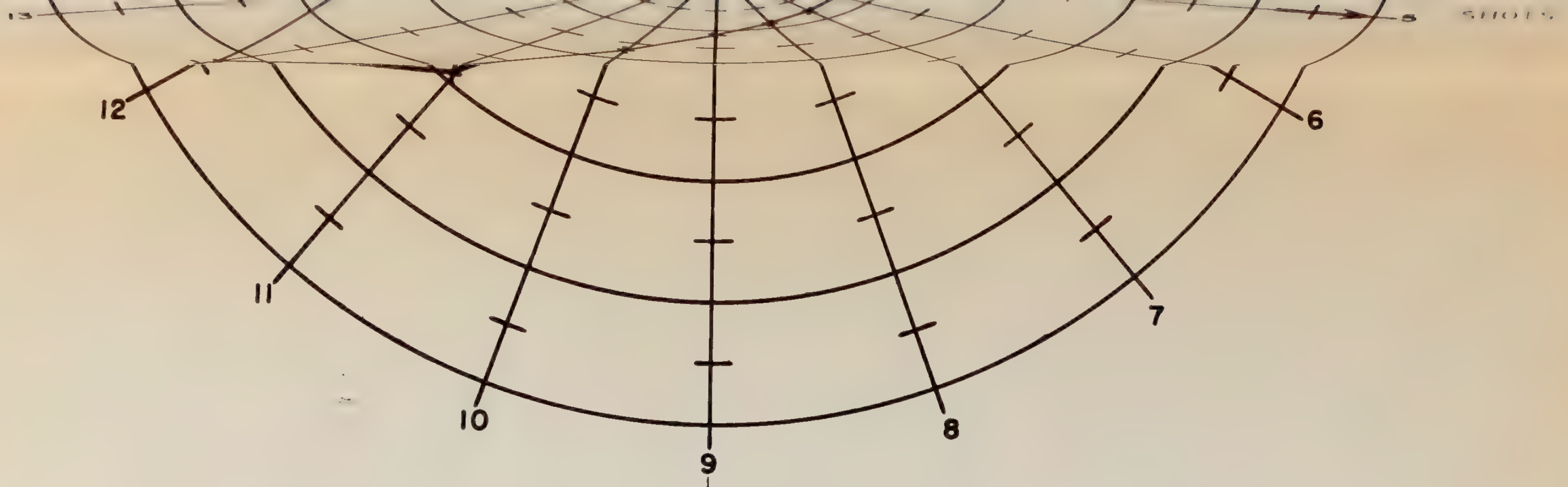
Schlumberger

RADIORIENTATION PLOT

POT-B

NO.3-SHORT STRING PERFORATED 1177-1187 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





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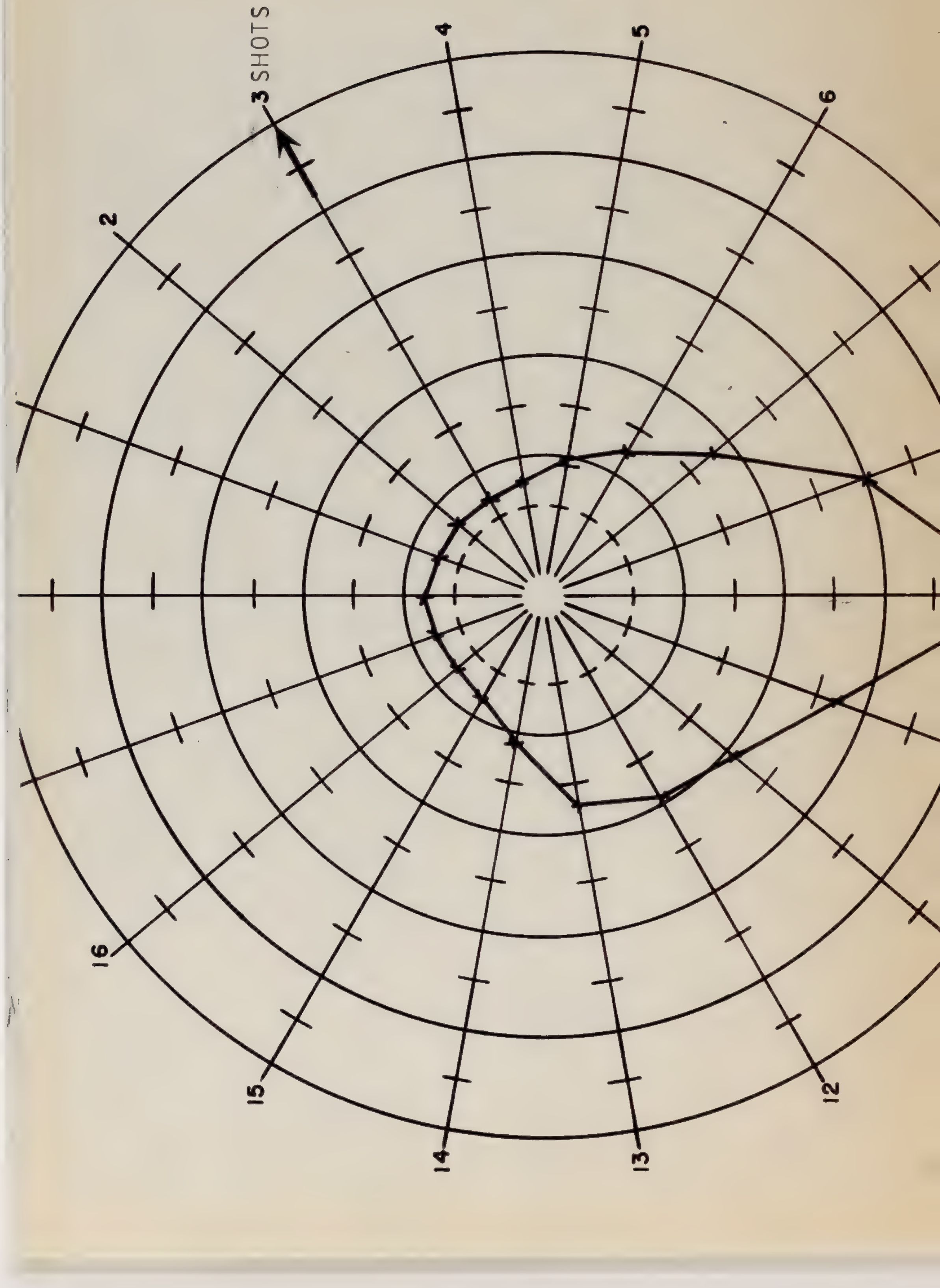
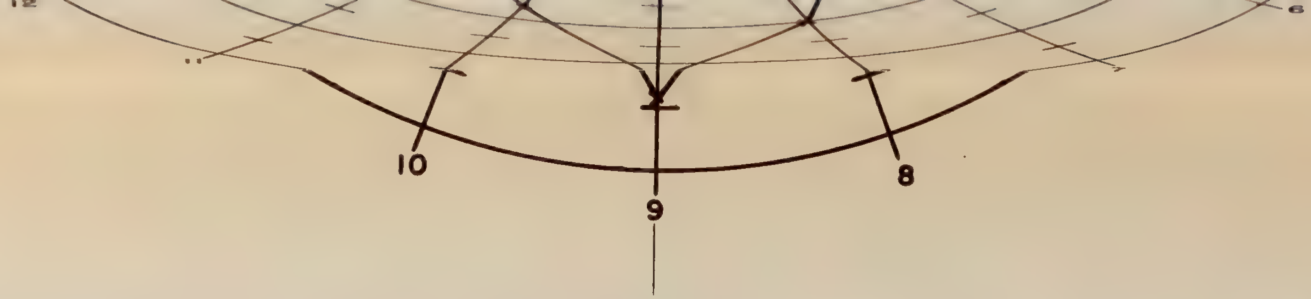
RADIORIENTATION PLOT

POT-B

NO.3-SHORT STRING PERFORATED 1166-1176 ONE SHOT PER FOOT WITH 1 1 1/16" HYPERDOME


3 SHOTS
2
4
5
6
12
13
14
15
16



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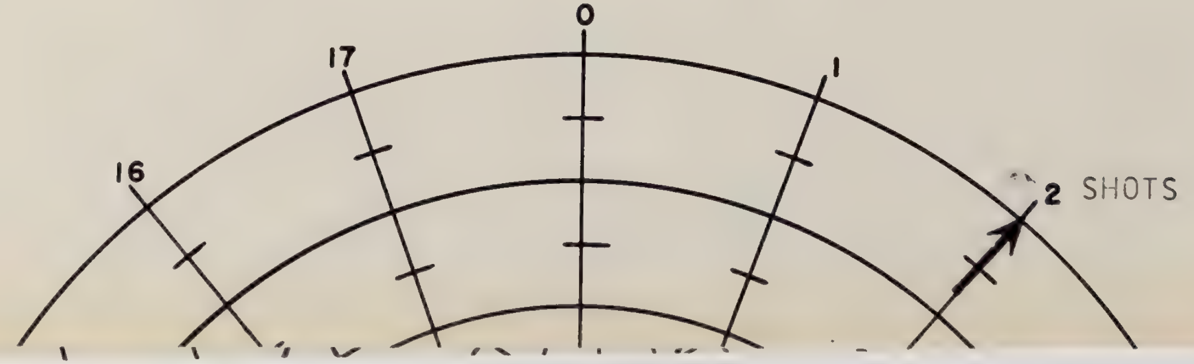
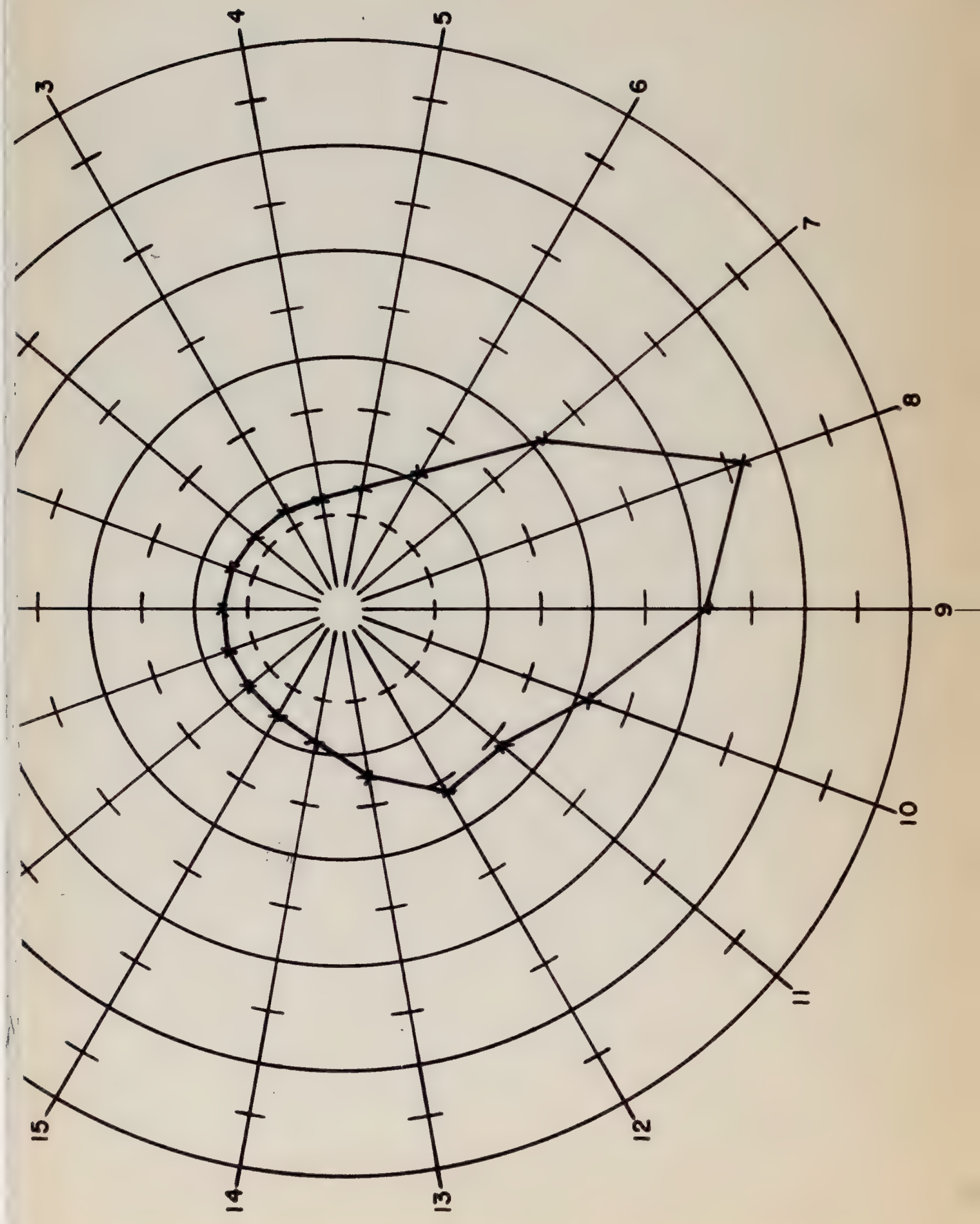
RADIORIENTATION PLOT

POT-B

NO.3-SHORT STRING PERFORATED 1155-1165 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME




3
4
5
6
7
8
9
10
11
12
13
14
15

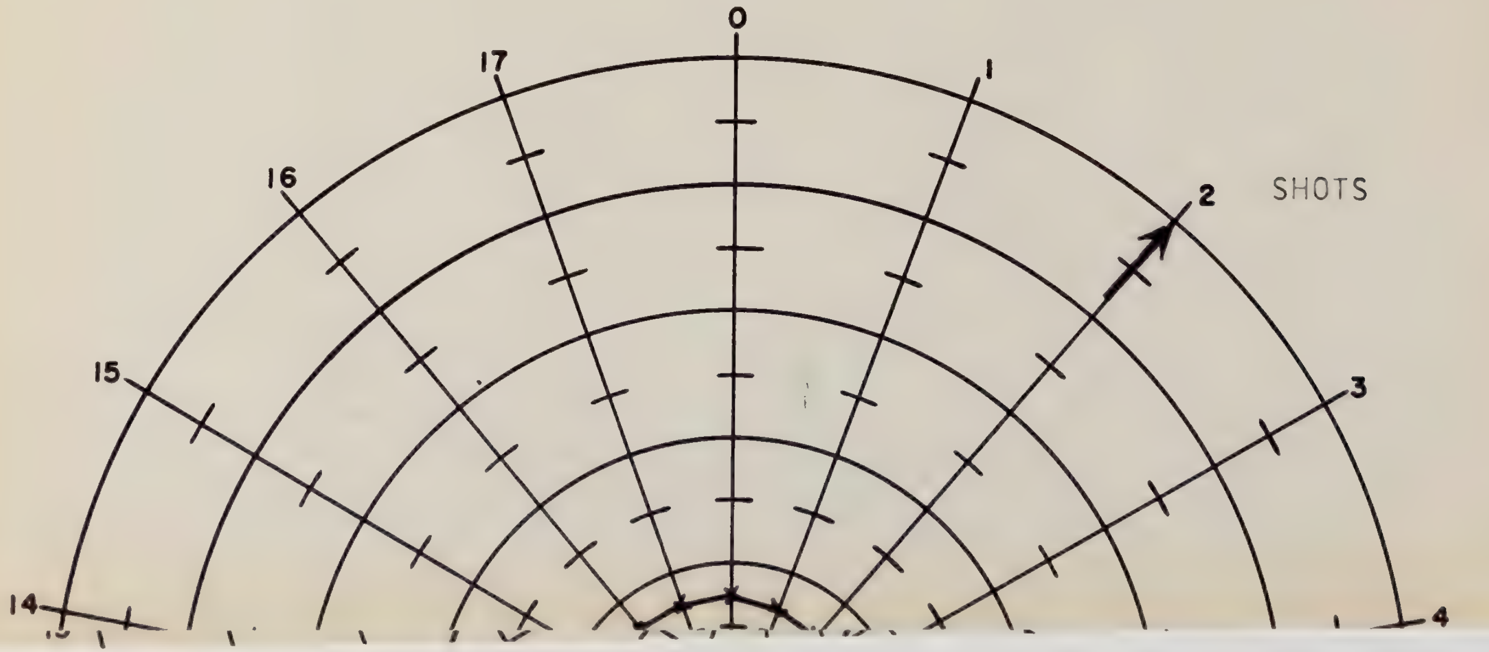
is chart, computation and or interpretation of our readings from our gamma gamma orientation and de-
ecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions
is are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse
ide of our Service Order for this job. The readings could be adversely affected by vagrant metal in the
Irill hole and other conditions unknown to us.

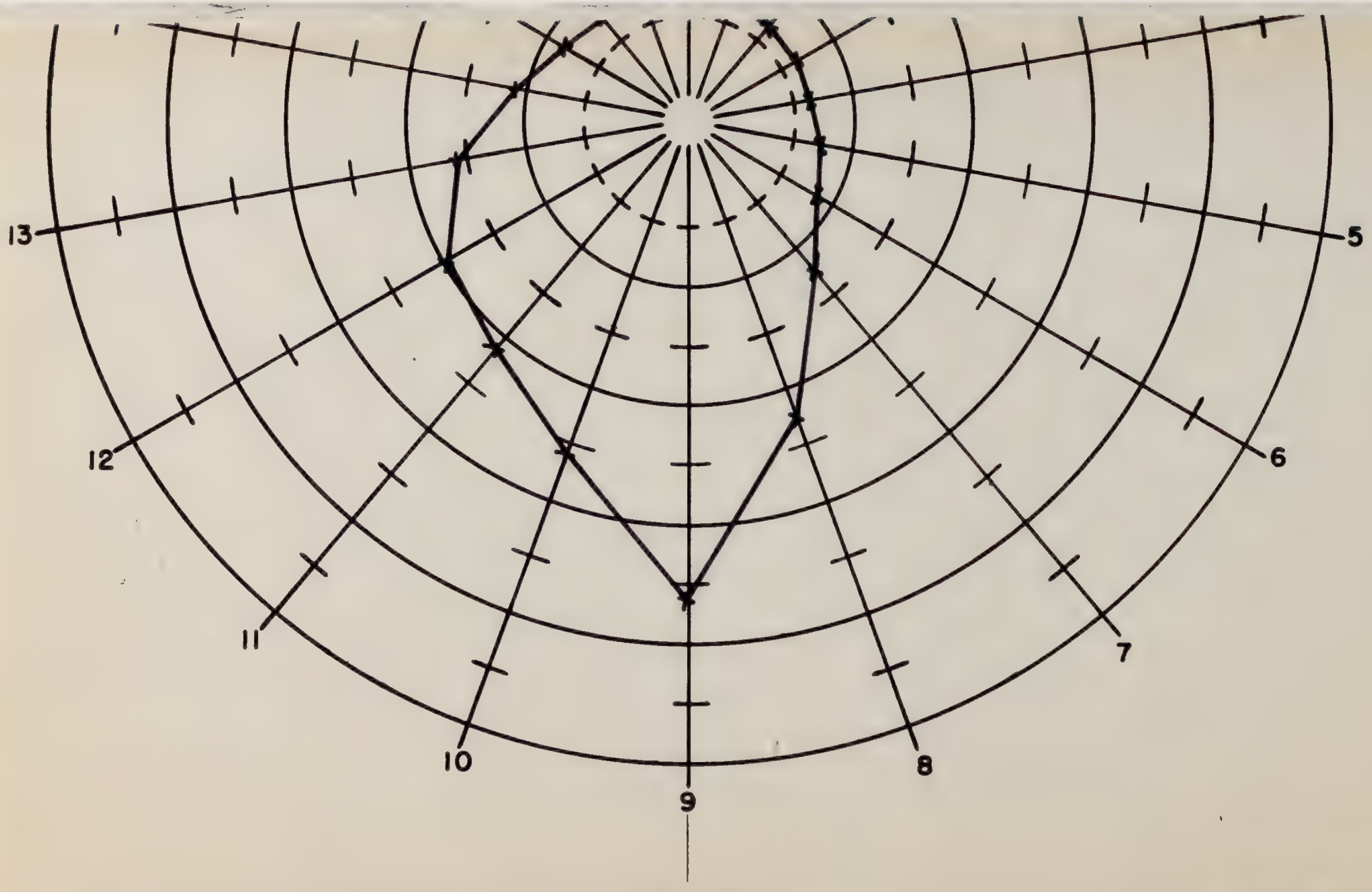
Schlumberger

RADIORIENTATION PLOT

POT-B

IO.3-SHORT STRING PERFORATED 1144-1154 ONE SHOT PER FOOT WITH 1 1 1/16" HYPERDOME





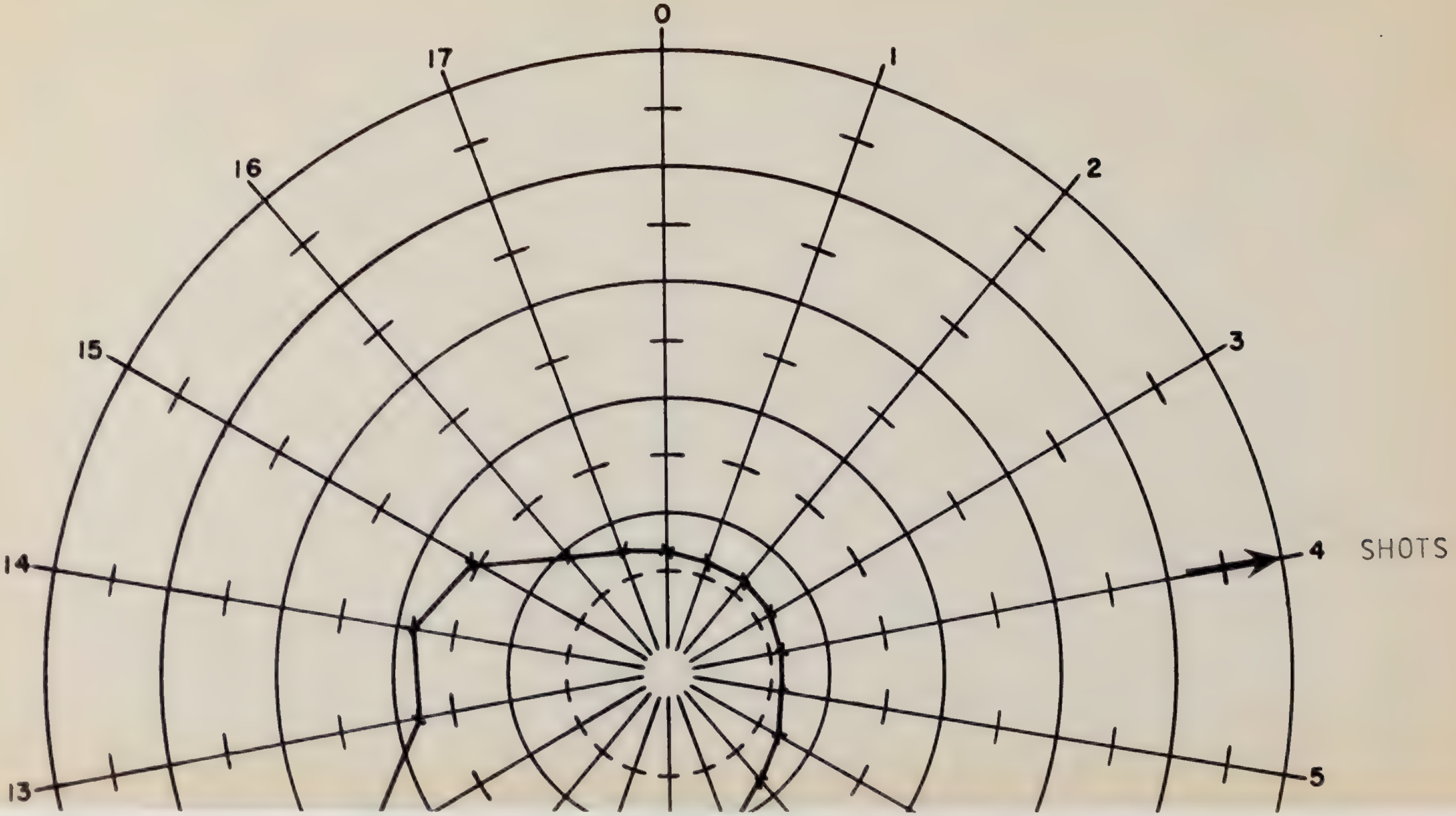
s chart, computation and/or interpretation of our readings from our gamma-gamma orientation and de-
ting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions
are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse
e of our Service Order for this job. The readings could be adversely affected by vagrant metal in the
ll hole and other conditions unknown to us.

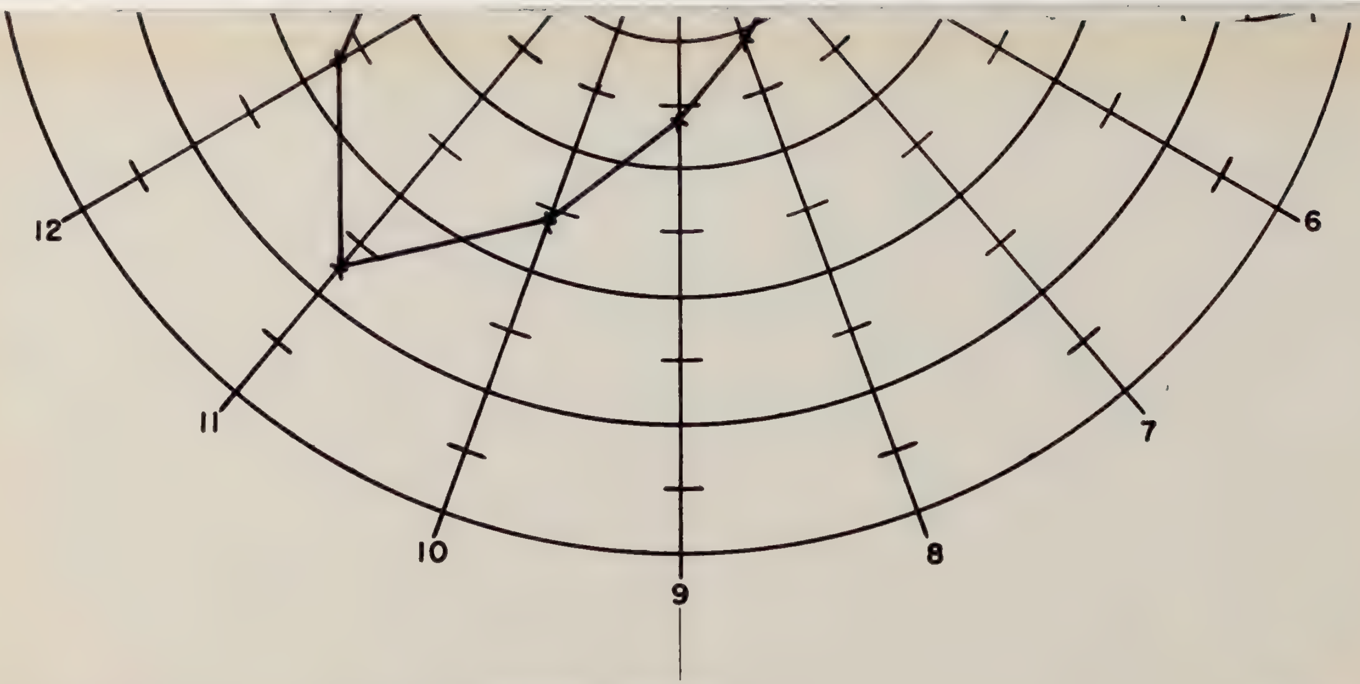
Schlumberger

RADIORIENTATION PLOT

POT-B

O.3-SHORT STRING PERFORATED 1133-1143 ONE SHOT PER FOOT WITH 1 11/16' HYPERDOME





This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by vagrant metal in the drill hole and other conditions unknown to us.

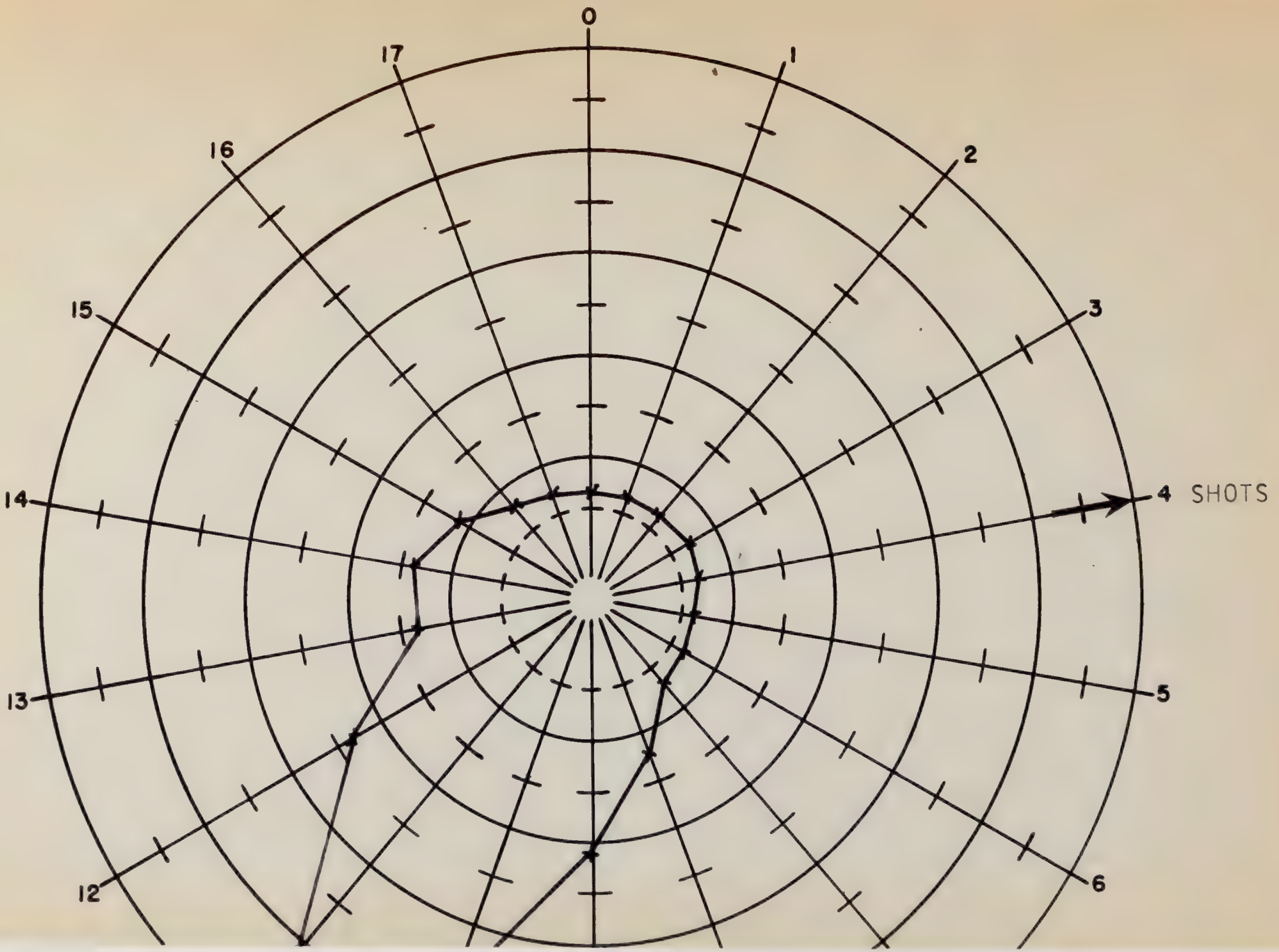
Schlumberger

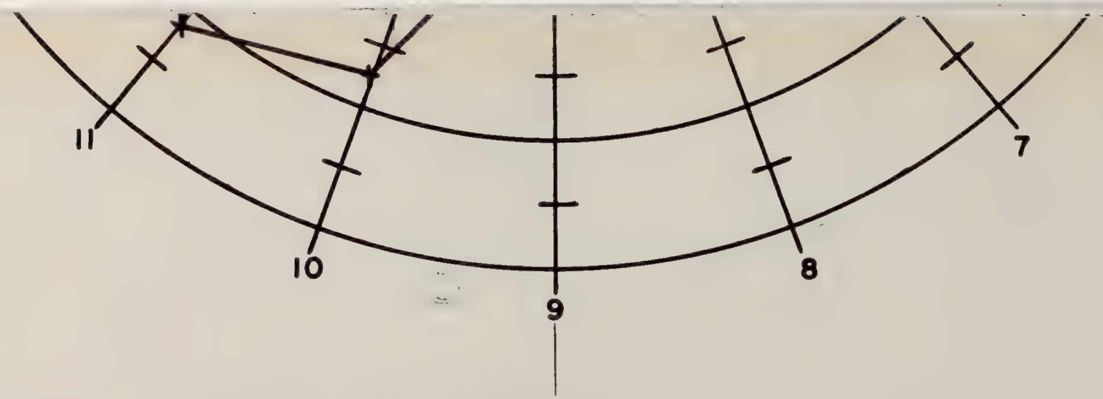
RADIORIENTATION PLOT

RADIORIENTATION PLOT

POT-B

NO. 3 - SHORT STRING PERFORATED 1122 1132 ONE SHOT PER FOOT WITH [illegible]





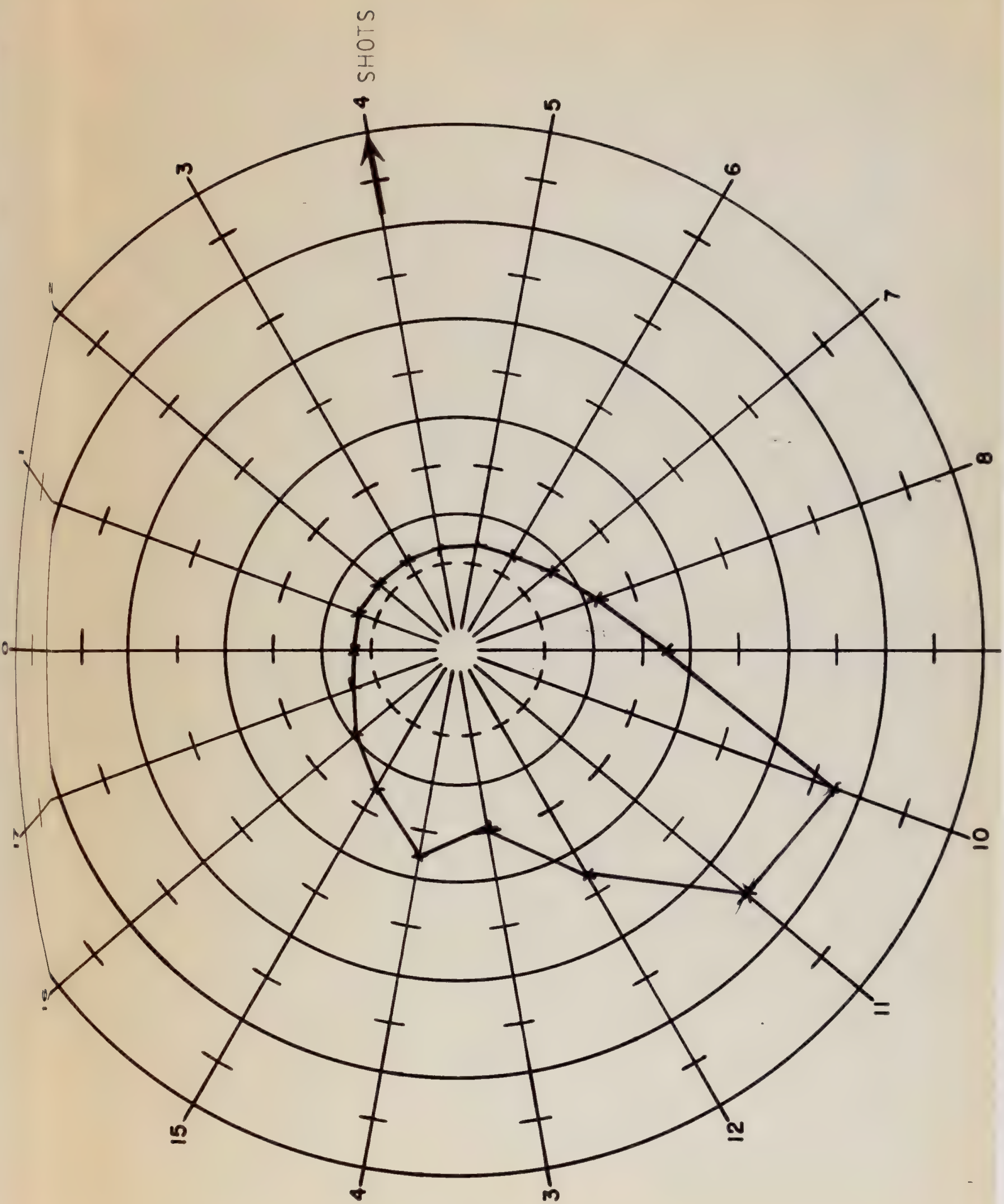
This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by vagrant metal in the drill hole and other conditions unknown to us.

Schlumberger

RADIORIENTATION PLOT

POT-B

NO.3-SHORT STRING PERFORATED 1111-1121 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME


0
1
2
3
4
SHOTS
5
6
7
8
10
11
12
13
14
15
16
17

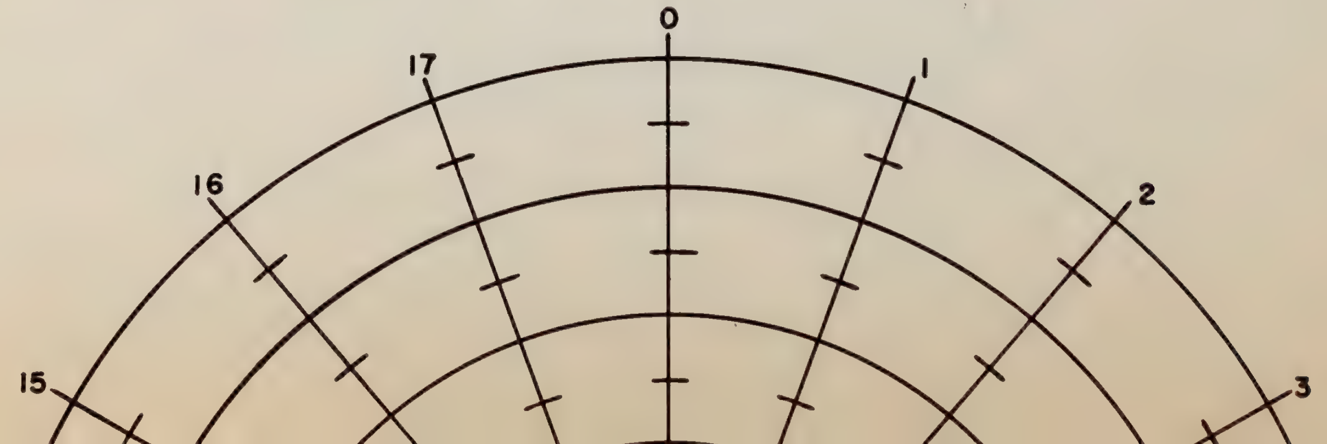
This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by vagrant metal in the drill hole and other conditions unknown to us.

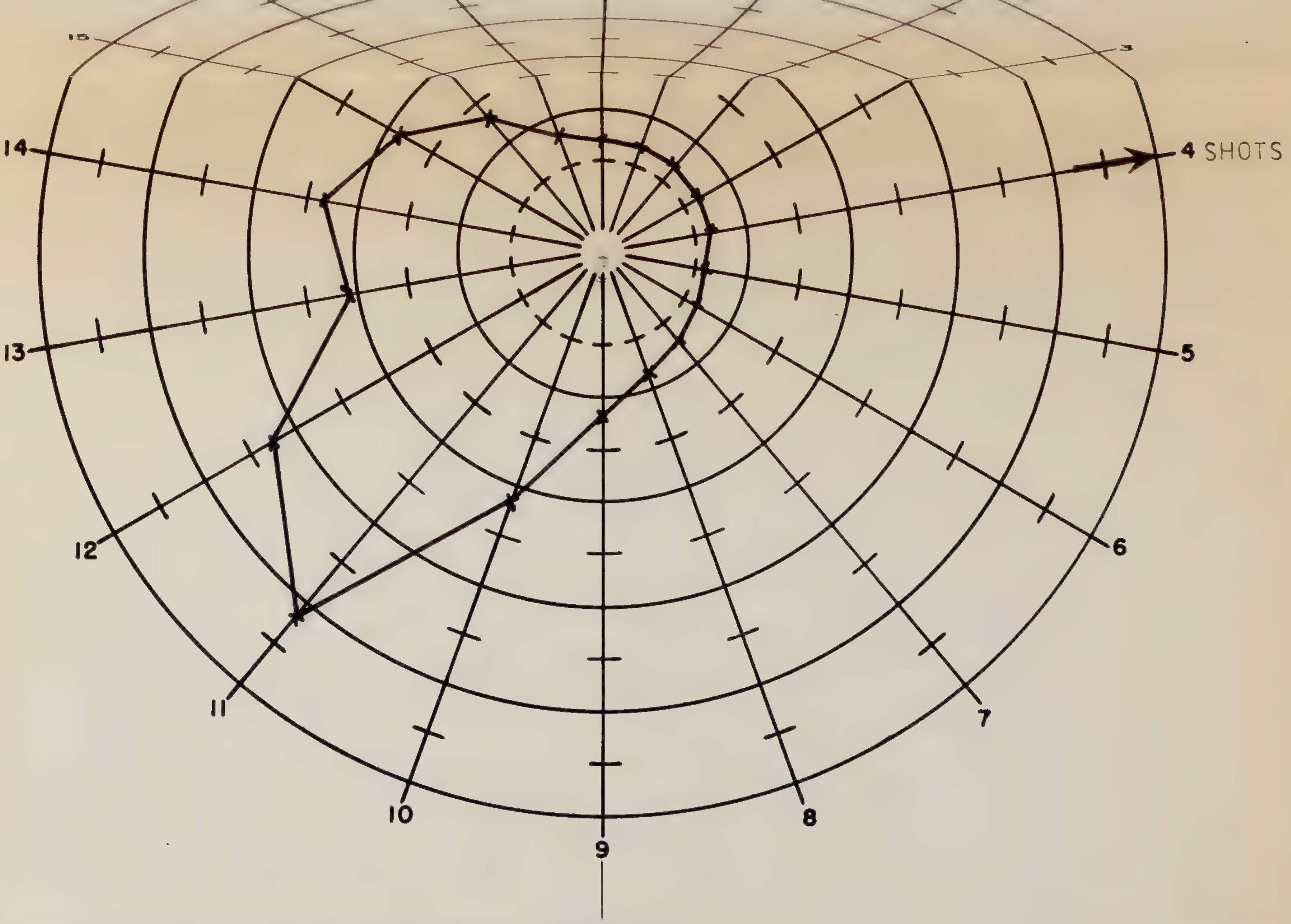
Schlumberger

RADIORIENTATION PLOT

POT-B

NO.3-SHORT STRING PERFORATED 1100-1110 ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME





This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by vagrant metal in the drill hole and other conditions unknown to us.

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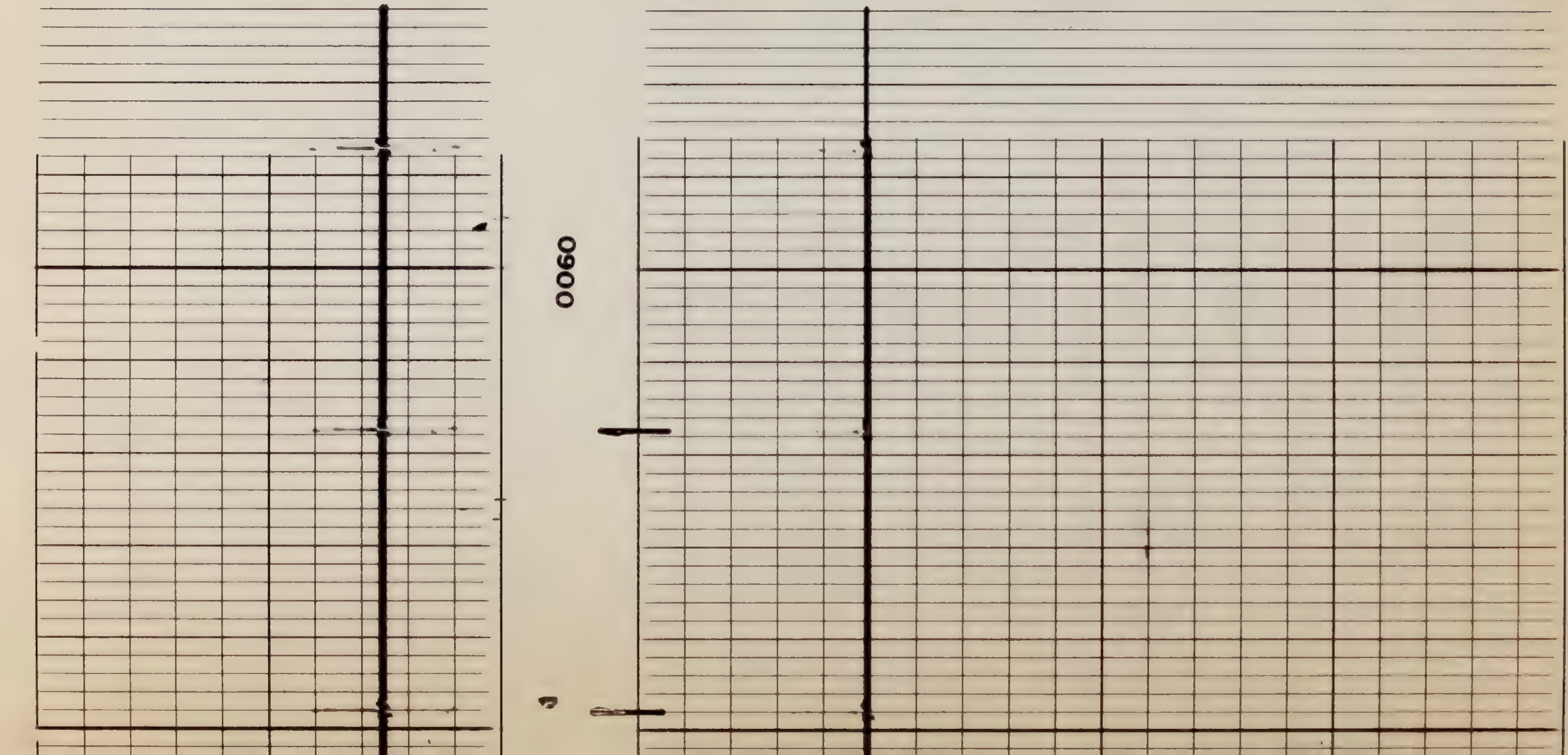
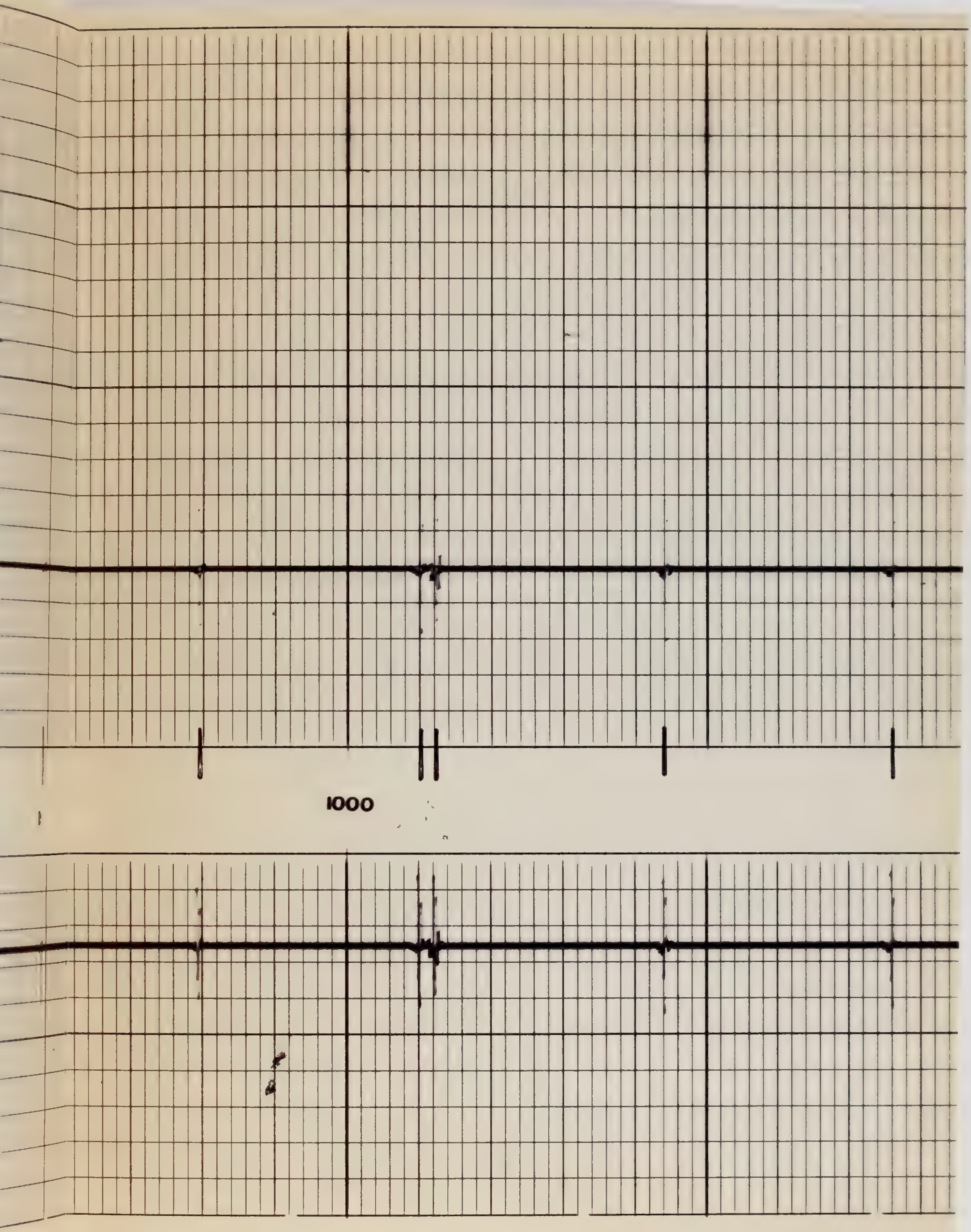
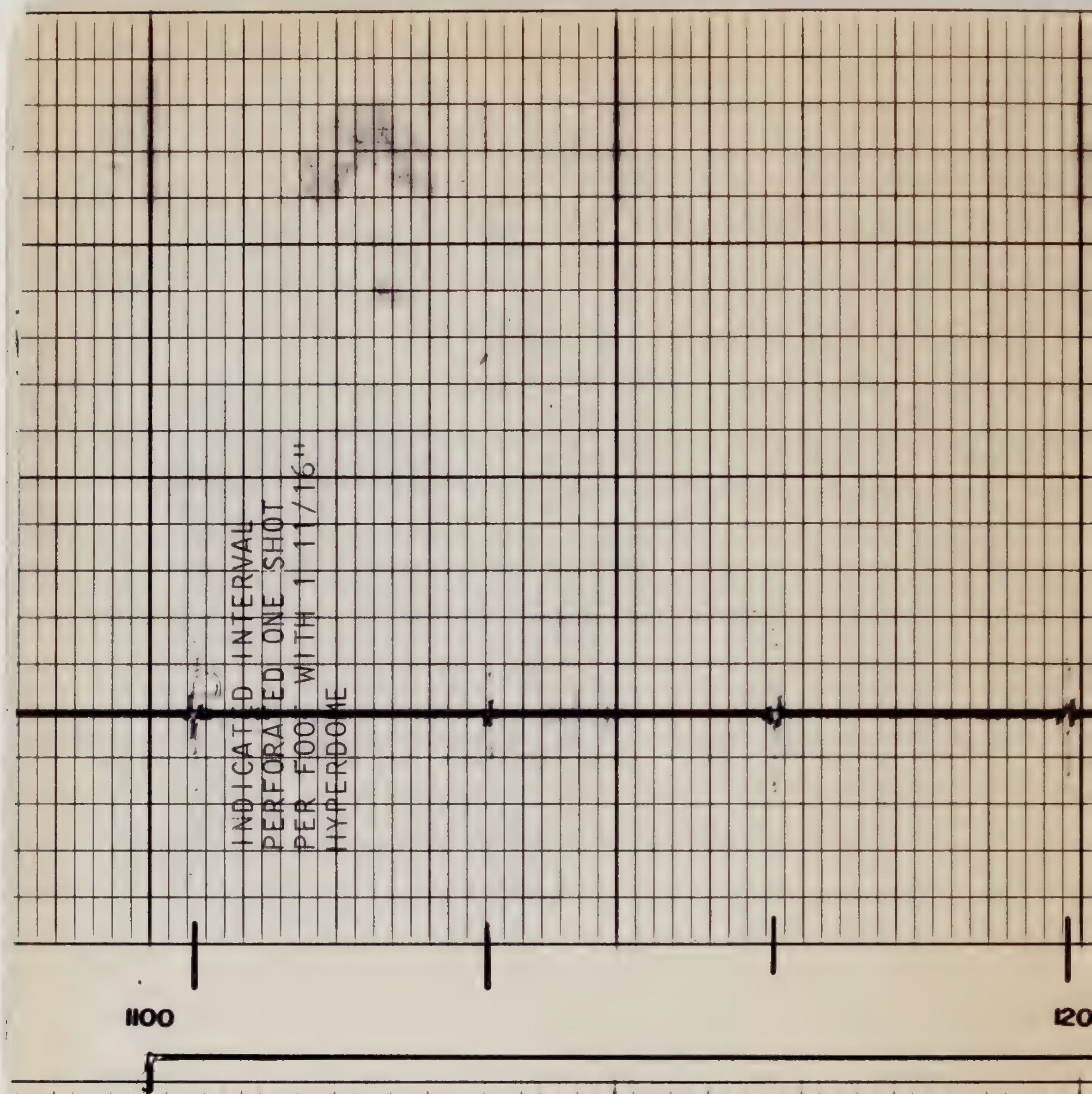
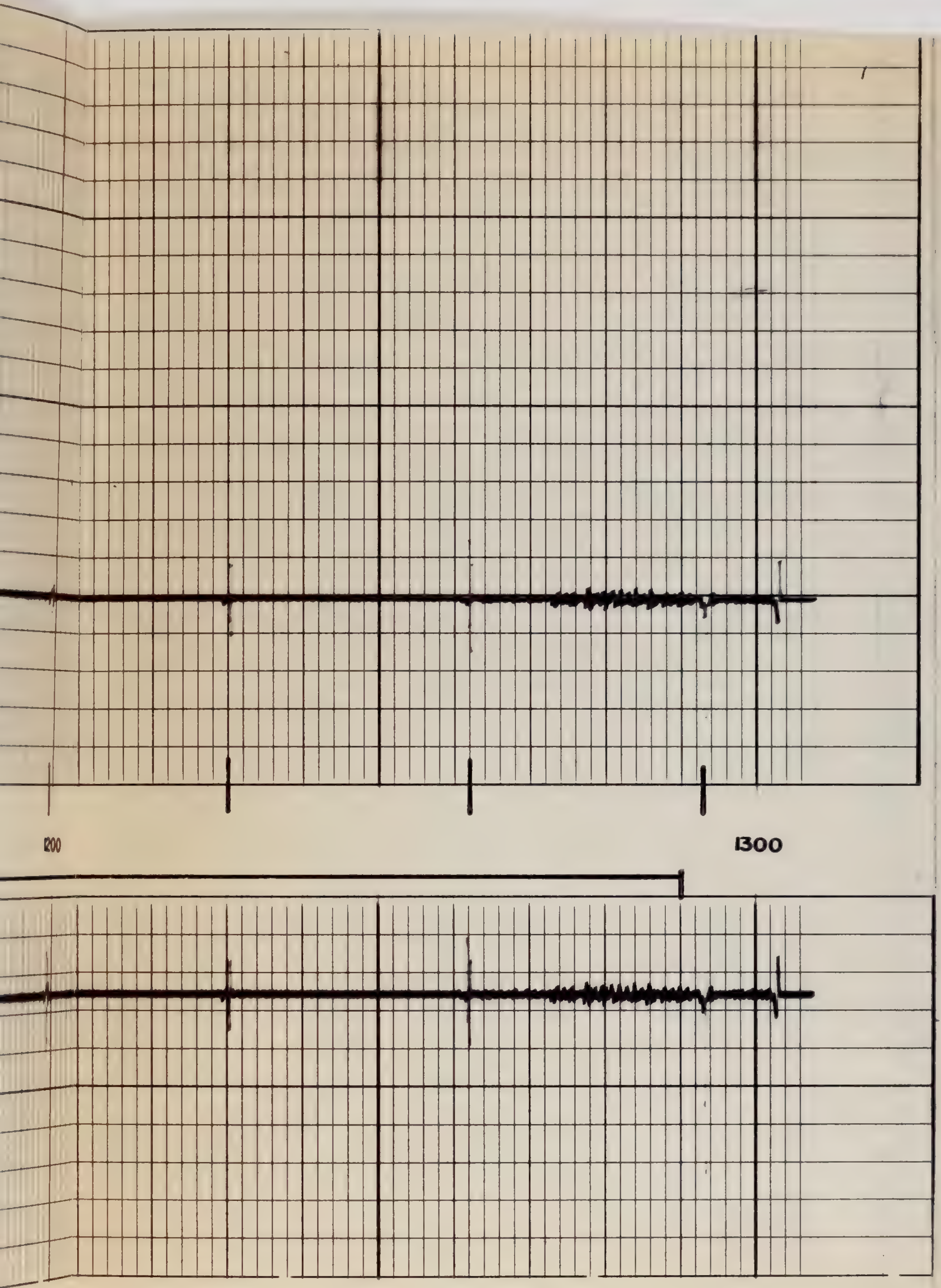
NO.3-SHORT STRING COLLAR LOG RUN
AFTER PERFORATING




1000


INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH 1 11/16"
HYPERDOME
1100
120



ATLANTIC RICHFIELD COMPANY

COMPANY

COMPANY ATLANTIC RICHFIELD COMPANY

WELL S.G. NO.11

FIELD SORGHUM GULCH

RIO BLANCO, COLORADO

Schlumberger

PRODUCTION LOGGING SERVICES

SWS–1425-B

Schlumberger

CEMENT BOND LOG

VDL-CCL

COUNTY RIO BLANCO
Field or LOCATION SORGHUM GULCH
WELL S.G. NO.17
COMPANY ATLANTIC RICHFIELD COMPANY

COMPANY ATLANTIC RICHFIELD COMPANY

WELL S.G.NO.17

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

LOCATION API Serial No.
436' FWL & 181' FSL

Sec. 16 Twp. 3S Rge. 46W

Other Services:
PDC-GR
ORP-HD

Permanent Datum: GROUND LEVEL, Elev. 7036
Log Measured From GL, 0 Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B. ----
D.F. ----
G.L. 7036

Date	2-21-75	Type Drill Fluid	WATER
Run No.	ONE	Fluid Level	FULL
Depth — Driller	2305-1490	Max. Rec. Temp.	---- °F
Depth — Logger	2285-1503	Est. Cement Top	1110
Btm. Log Interval	2277-1435	Equip. | Location	3862 | VERNAL
Top Log Interval	0900-0900	Recorded By	ST. AUBYN
Open Hole Size	6 3/4	Witnessed By	MR. DON TAIT

CASING REC.	Size	Wt/Ft	Grade	Type Joint	Top	Bottom
Surface String	8 5/8	24		T & C	SURF	63
String (1)	2 3/8	4.7		T & C	SURF	2335
String (2)	2 3/8	4.7		T & C	SURF	1490
Liner						

PRIMARY CEMENTING DATA

STRING	Surface	Protection	Production	Liner
Vol. of cement			330 SKS	
Type of cement			HOWCO THIXOTROPER	
Additive				
Retarder				
Wt. of slurry			14.8#	
Water loss			----	
Type fluid in csg.			WATER	
Fluid wt.			----	

FOLD HERE

The well name, location and borehole reference data were furnished by the customer.

SWS-729-J

PRIMARY CEMENTING PROCEDURE	Hour — date	Hours from start of operation
Started pumping cement	17:30 1-07-75	
Release pressure	18:45 1-07-75	
Start Cement Bond Log	20:00 2-21-75	
Finish Cement Bond Log	24:00 2-21-75	

REMARKS

Service Order No. 51317

Csg. Collars Recorded 15 ft. DEEP

Preceding fluid______ Volume______ bbls.

Cement pumped______ bbls./minute

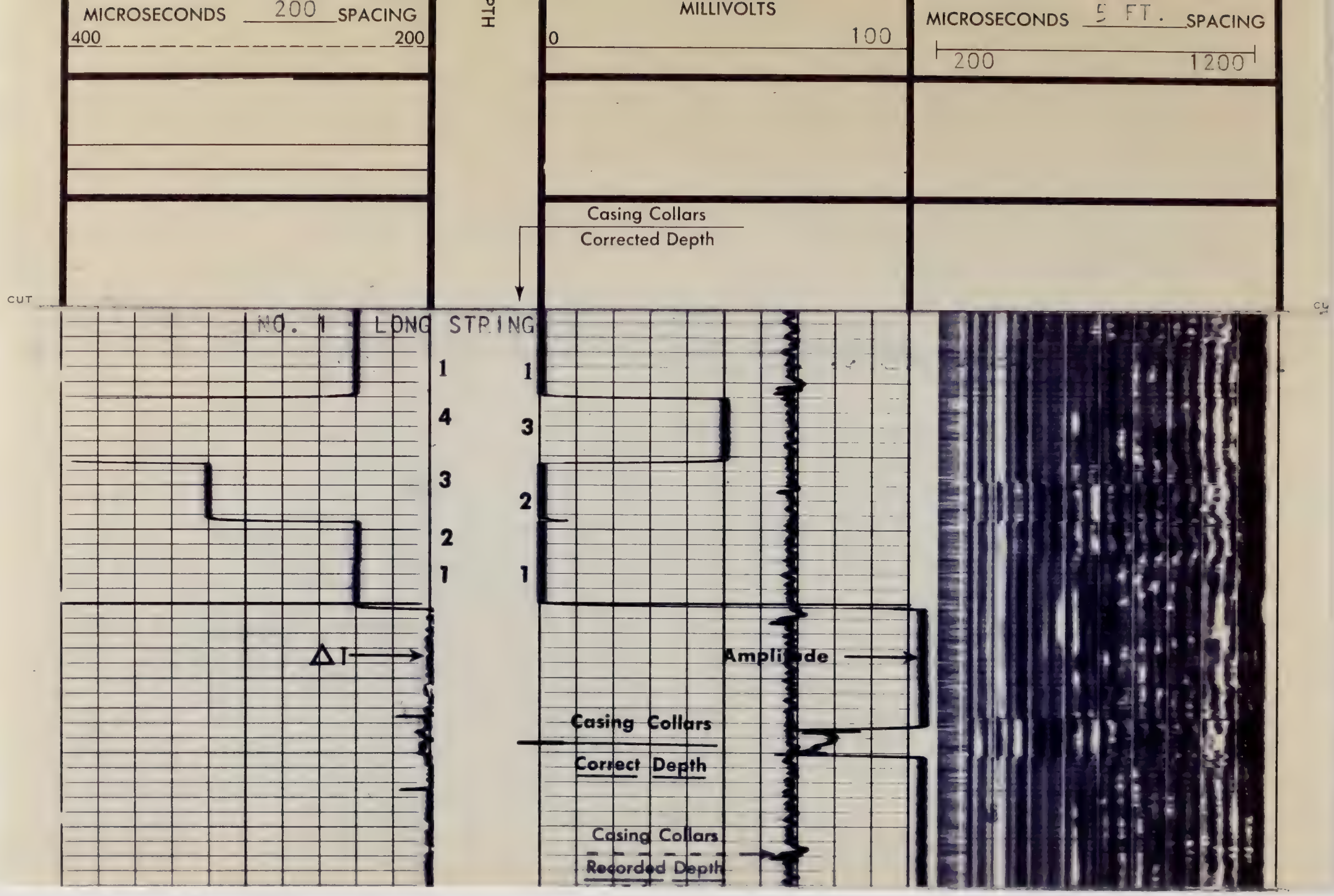
Pipe reciprocated during Pumping: Yes X No______

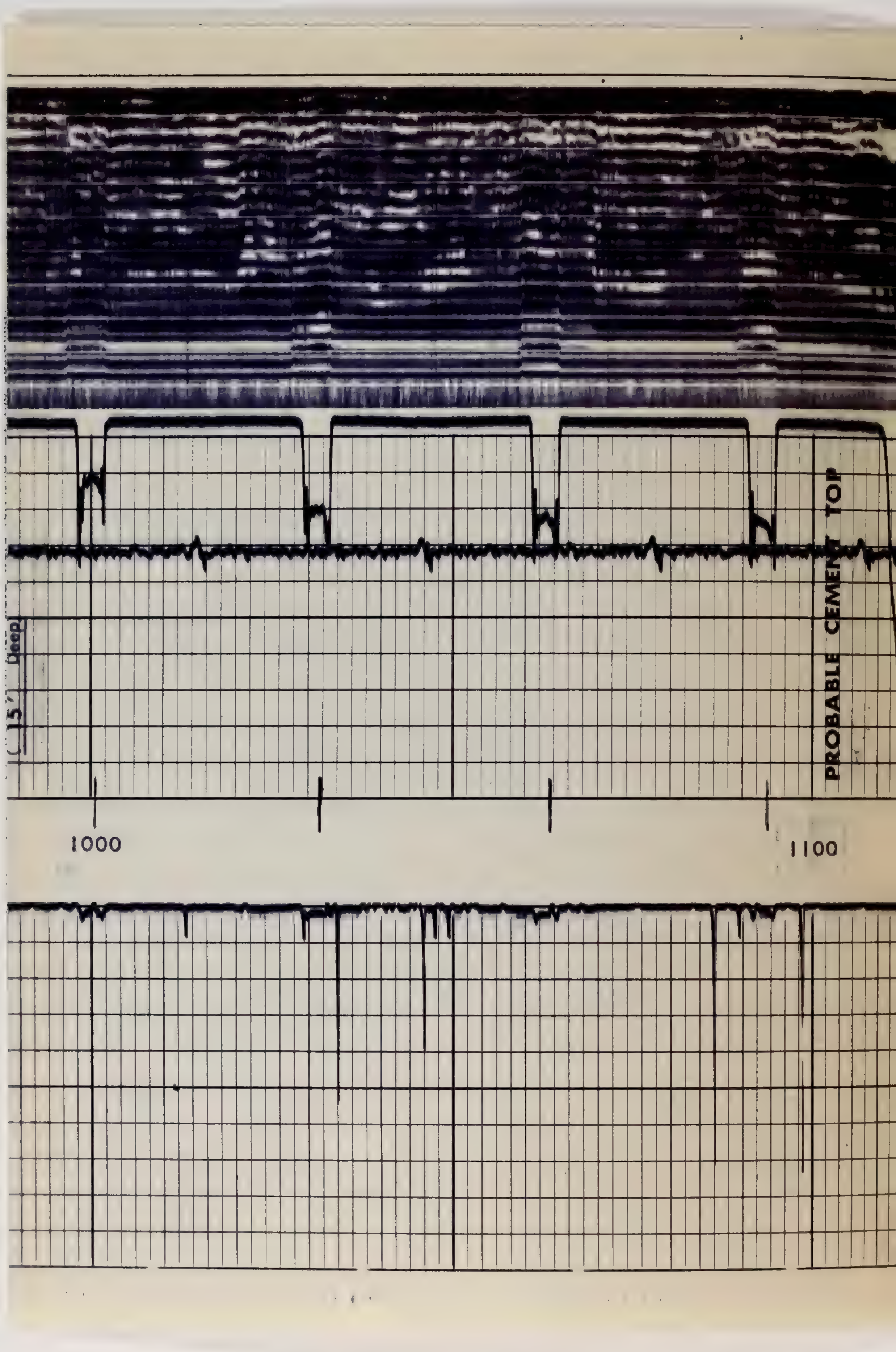
Pipe reciprocated after plug down: Yes______ min., No X

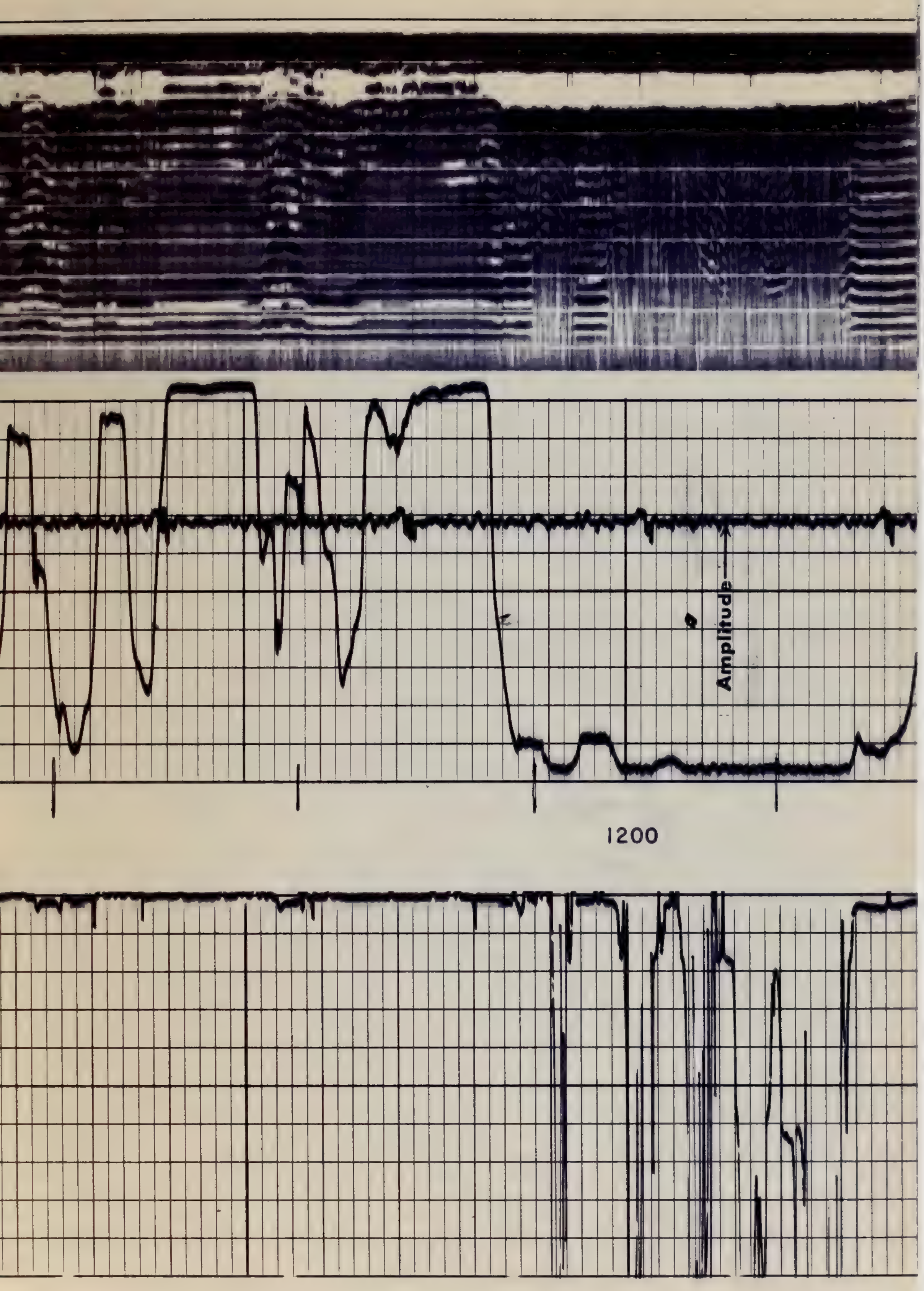
SQUEEZE JOB DETAIL		
Squeeze number	1	2
Date		
Depth interval		
Type cement		
Volume of cement		
Additive		
Retarder		
Weight of slurry		
Preceding fluid		
Breakdown pressure		
Max. pressure-stage 1		
" " " 2		
" " " 3		
Final maximum pressure		
Started pumping cement		
Released pressure		
Start CBL		
Finish CBL		

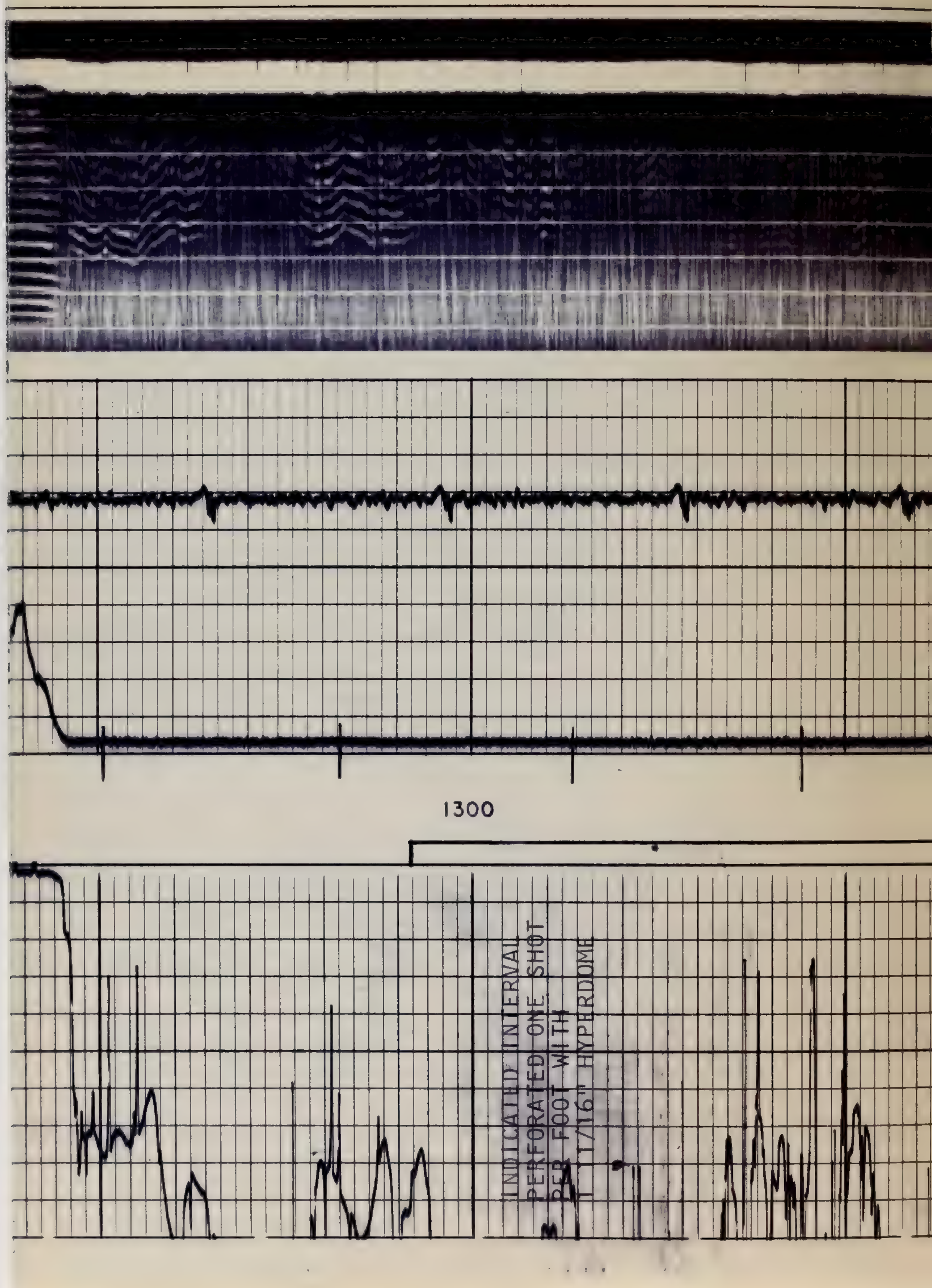
EQUIPMENT DATA	Centralizer Depths	Scratcher Depths
Sonic Panel No.	SLP-FH# 561	
Sonic Cart No.	SHH-AKA# 34	
Sonic Sonde No.	SLS-JC# 32	
CRP No.	14	
Mem Panel No.	---	
GR Panel No.	---	
GR Cart No.	---	
Centralizer: Type	CME-V	CAL-AJ#78
No.	CME-W	
To Level (MV)	100	
Cart. Gain	45	
CRP Intensity	.21	
R9G Intensity	8	
Logging Speed	30 FPM	
Time Constant		

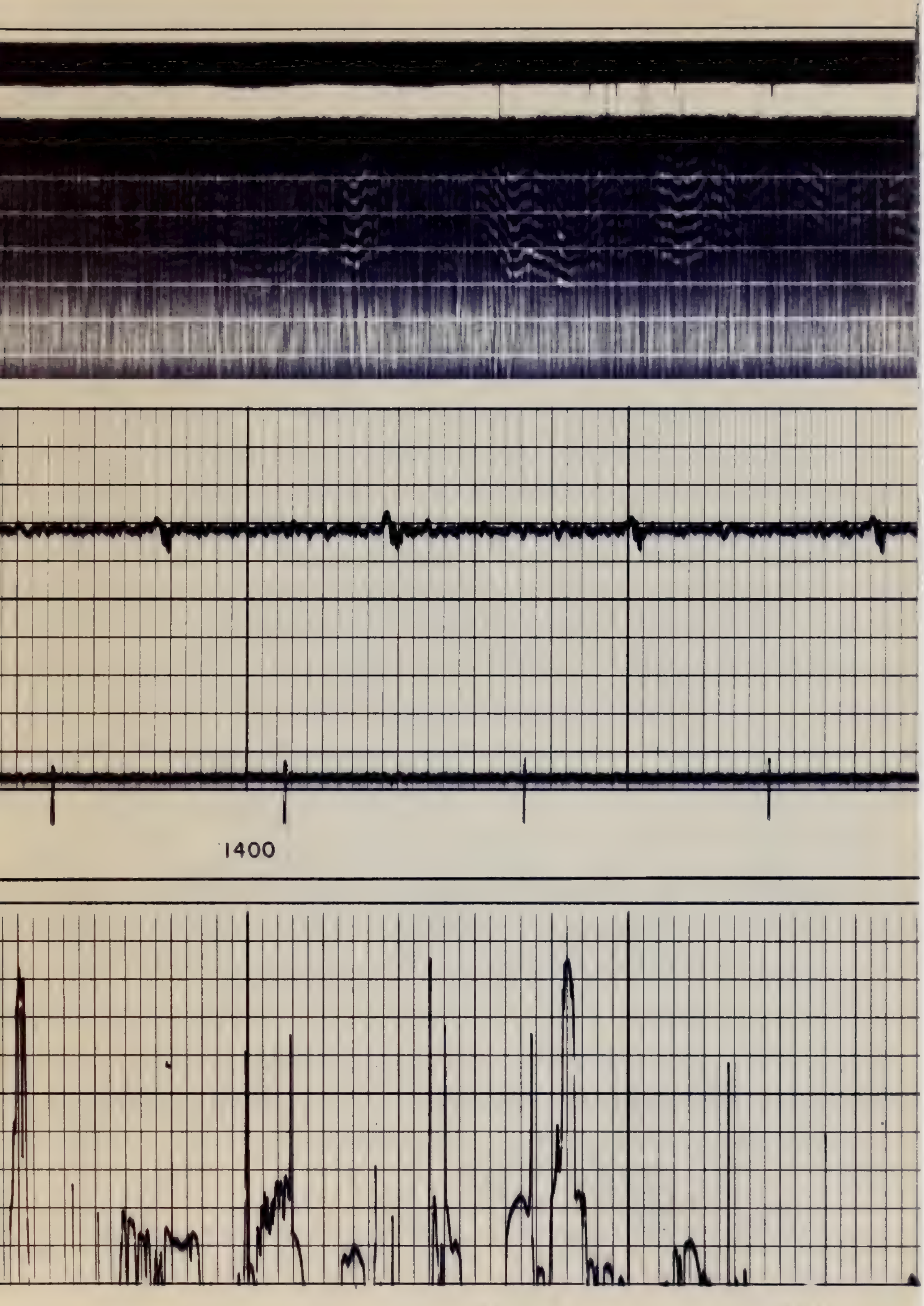
AVERAGE WELL DRIFT:
° from to ; ° from to ; ° from to

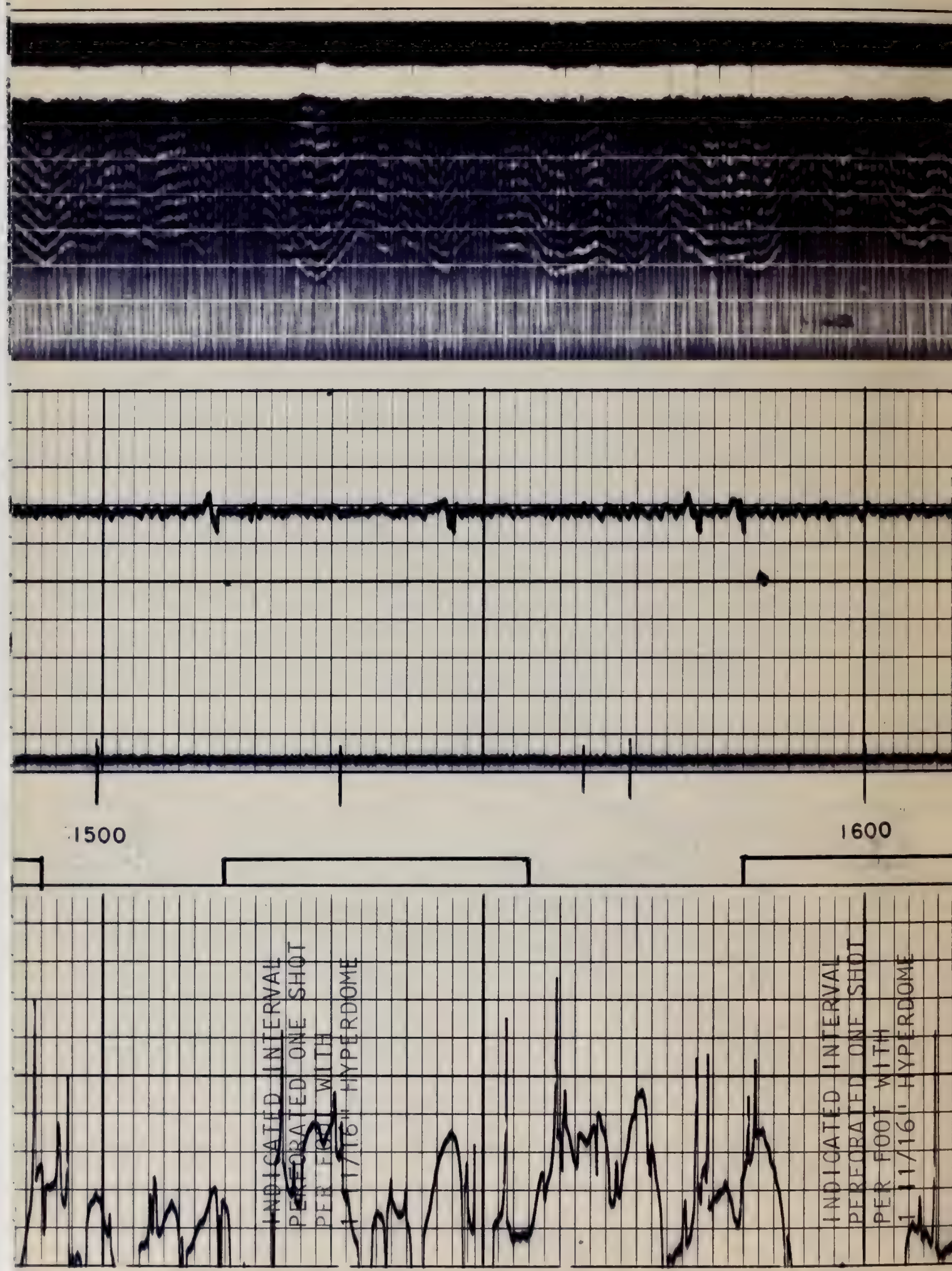

MICROSECONDS 200 SPACING
400
200
PTH
MILLIVOLTS
0
100
MICROSECONDS 5 FT. SPACING
200
1200
Casing Collars
Corrected Depth
CUT
CUT
NO. 1 - LONG STRING
1
4
3
2
1
1
3
2
1
ΔT
Amplitude
Casing Collars
Correct Depth
Casing Collars
Recorded Depth

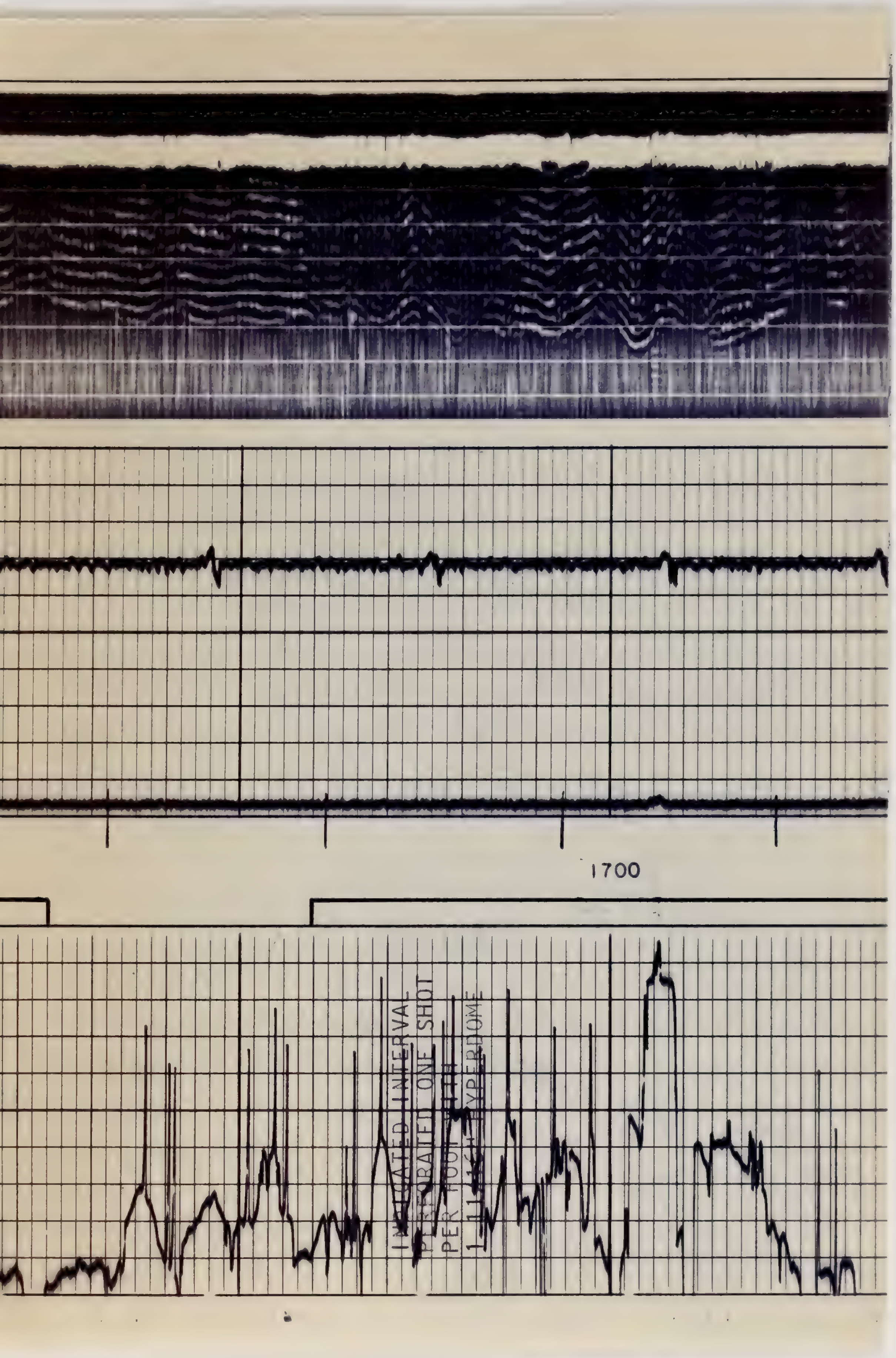

15'' Deep
PROBABLE CEMENT TOP
1000
1100

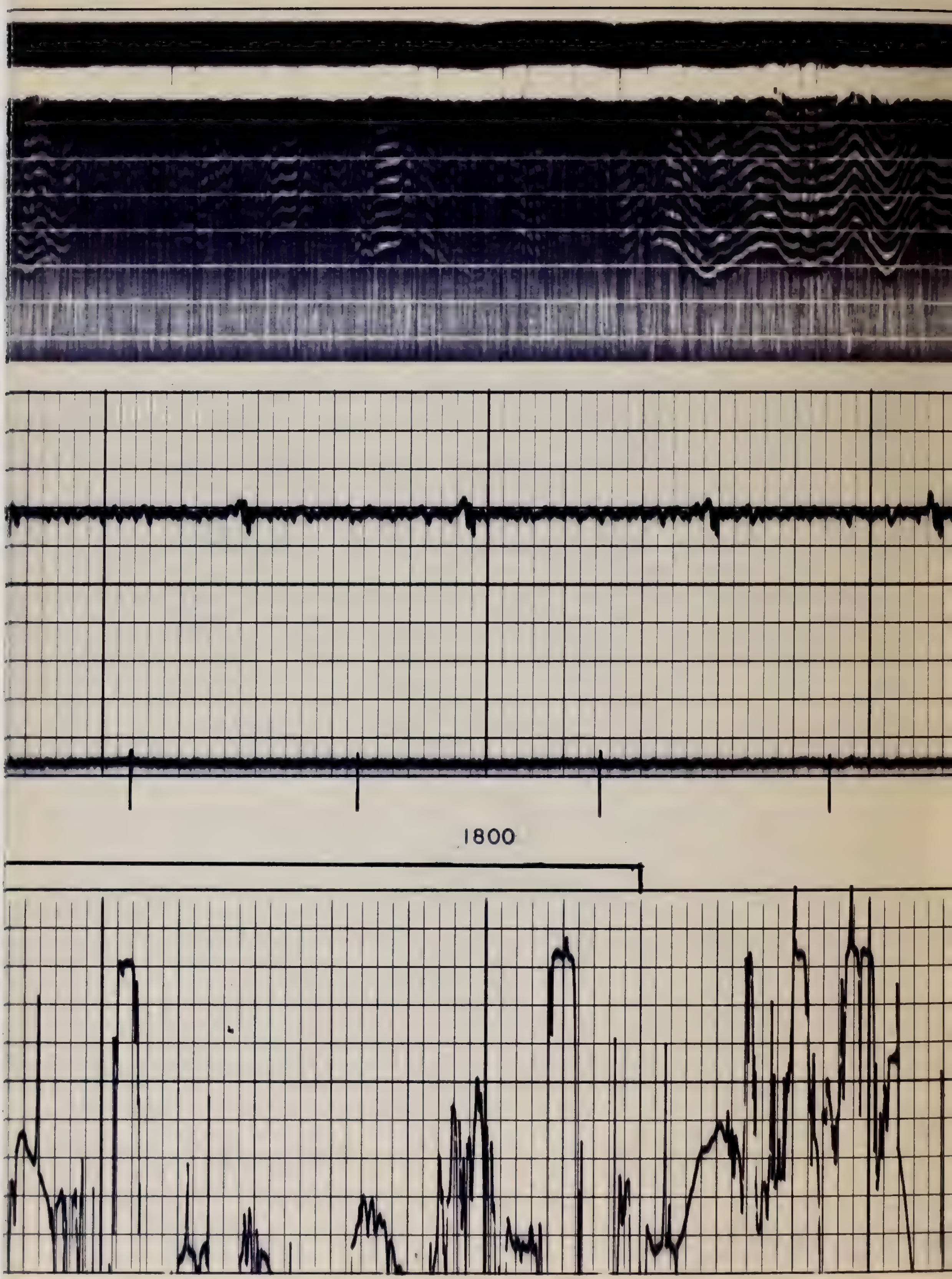

Amplitude
1200

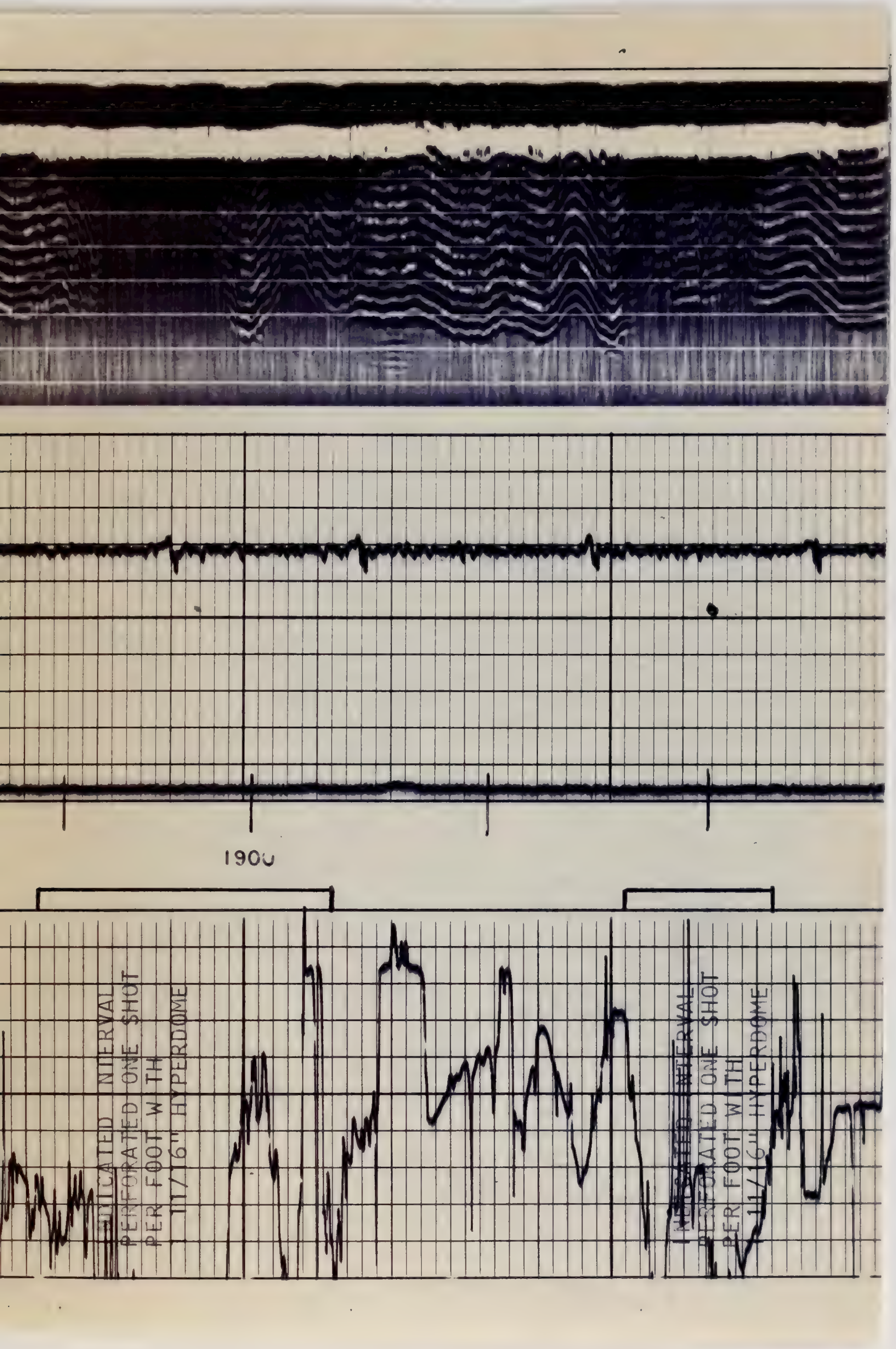

1300
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH
1 11/16" HYPERDOME

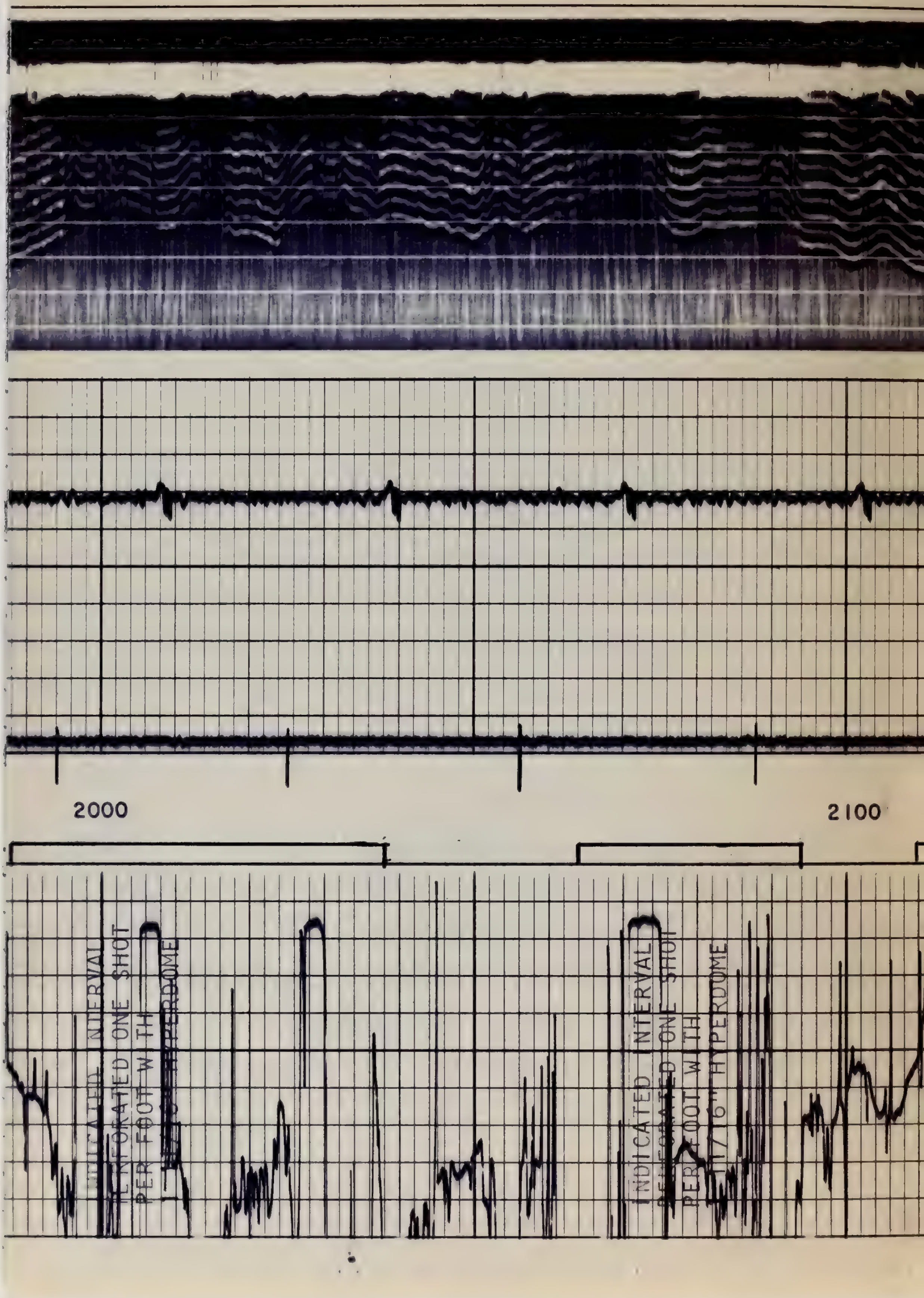

1400

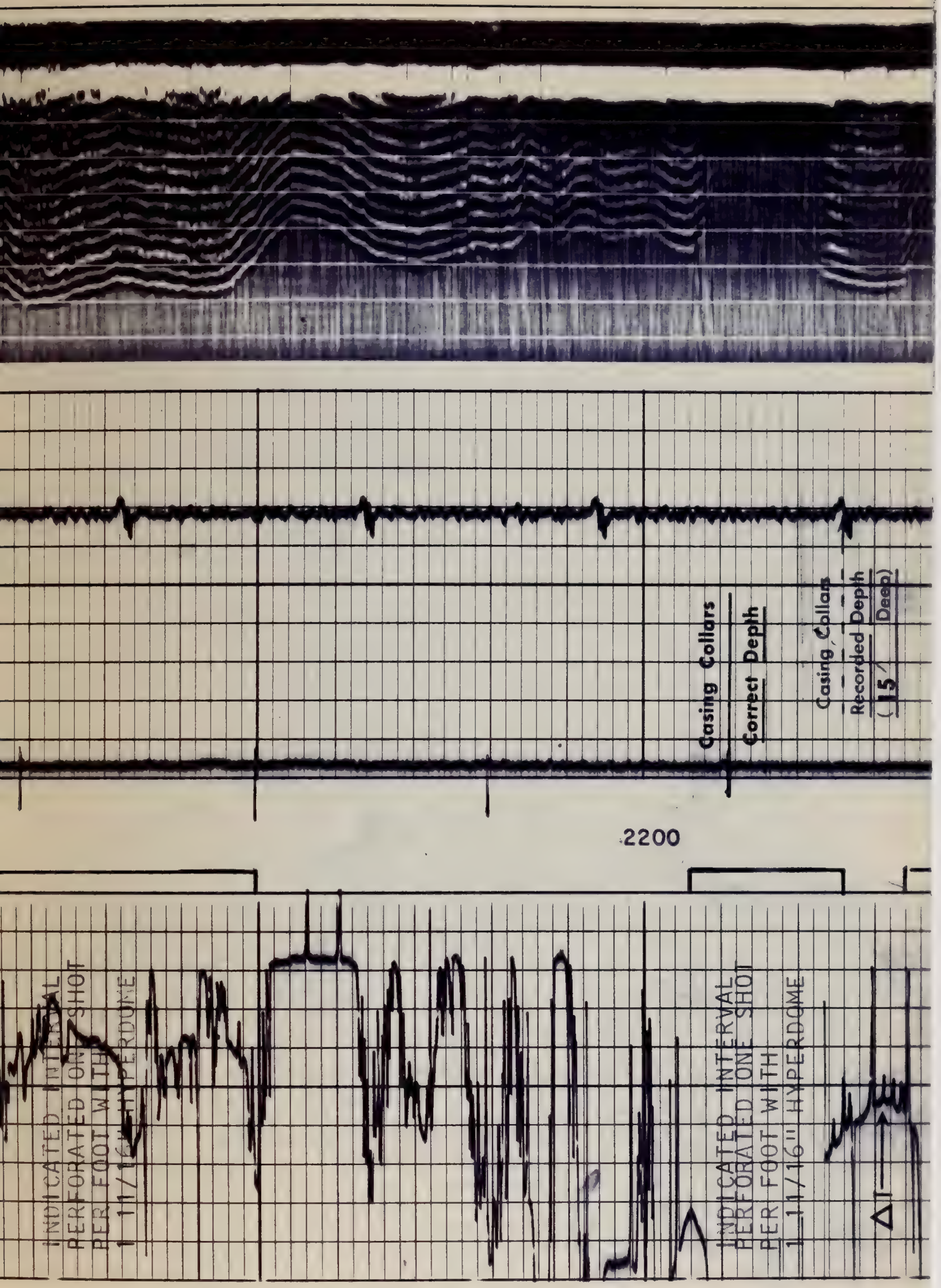

1500
1600
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH
1 11/16" HYPERDOME
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH
1 11/16" HYPERDOME

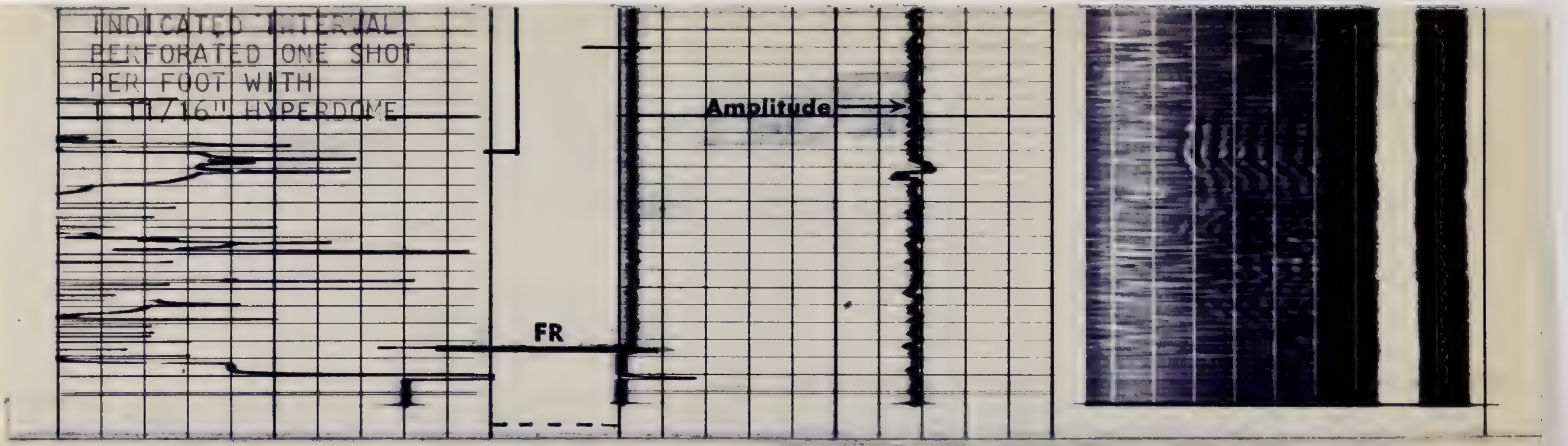

1700
INTEGRATED INTERVAL
CALIBRATED ONE SHOT
PER FOOT
PER FOOT
HYPERDOME

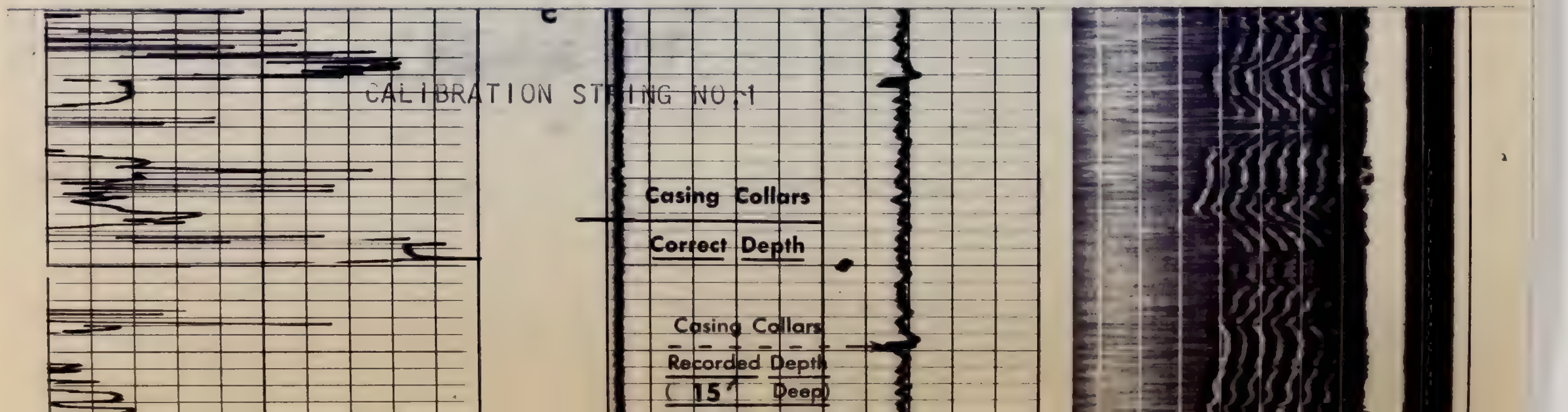

1800

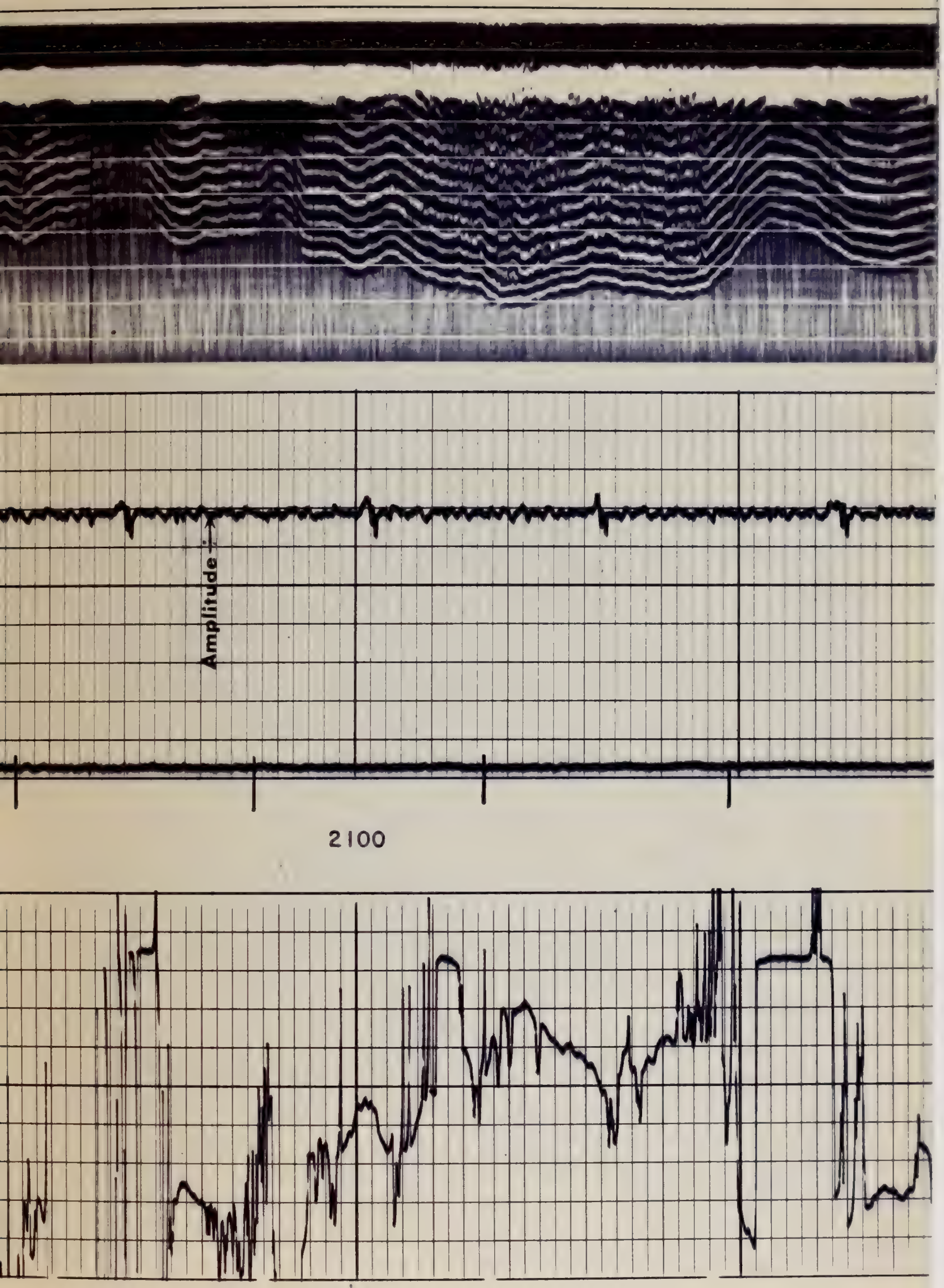

1900
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH
11/16" HYPERDOME
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH
11/16" HYPERDOME

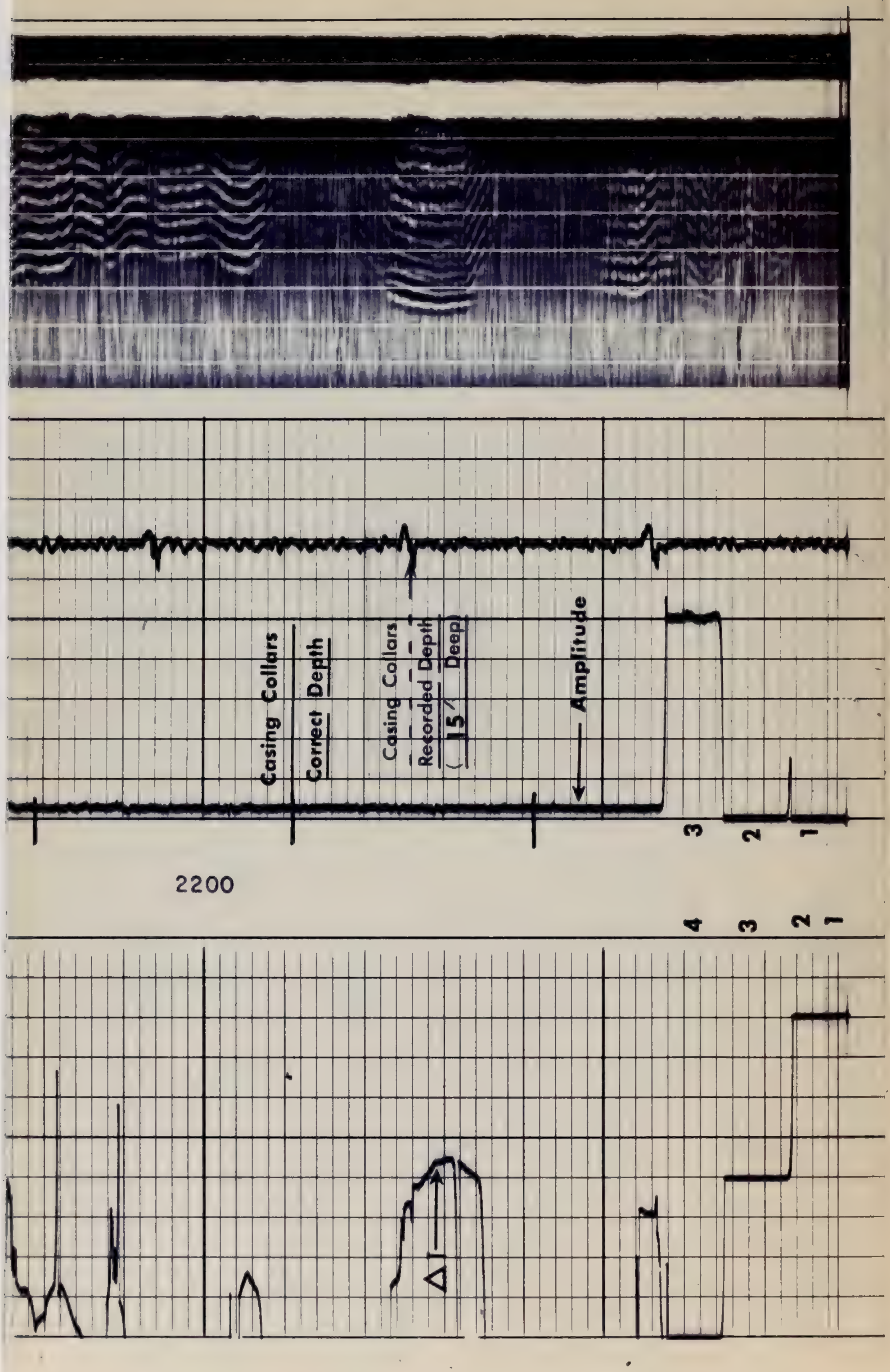

2000
2100
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH
1 11/16" HYPERDOME
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH
1 11/16" HYPERDOME


INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH
1 11/16" HYPERDOME
Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(15' Deep)
2200
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH
1 11/16" HYPERDOME
ΔT

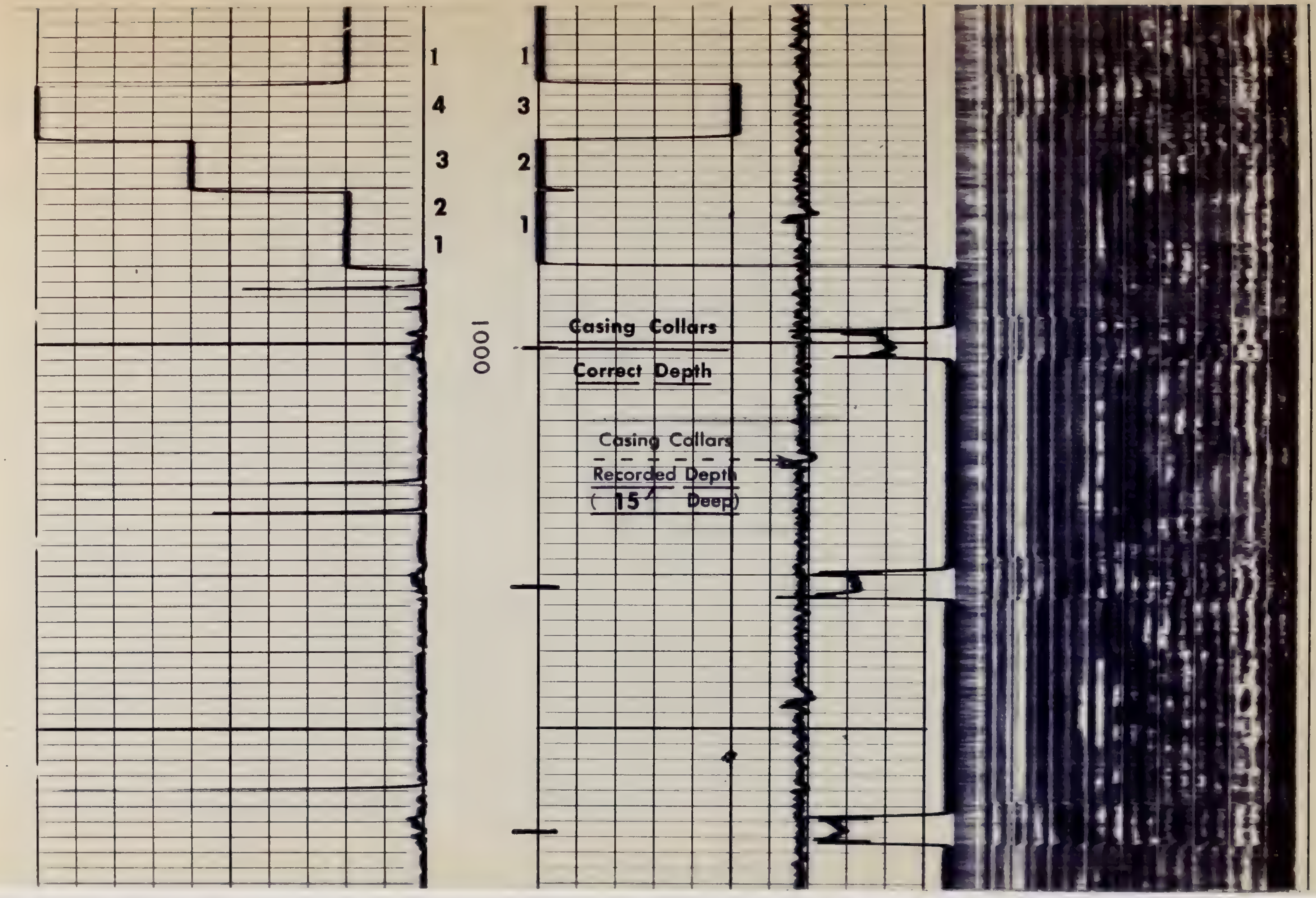

INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH
1 11/16" HYPERDOME
Amplitude
FR

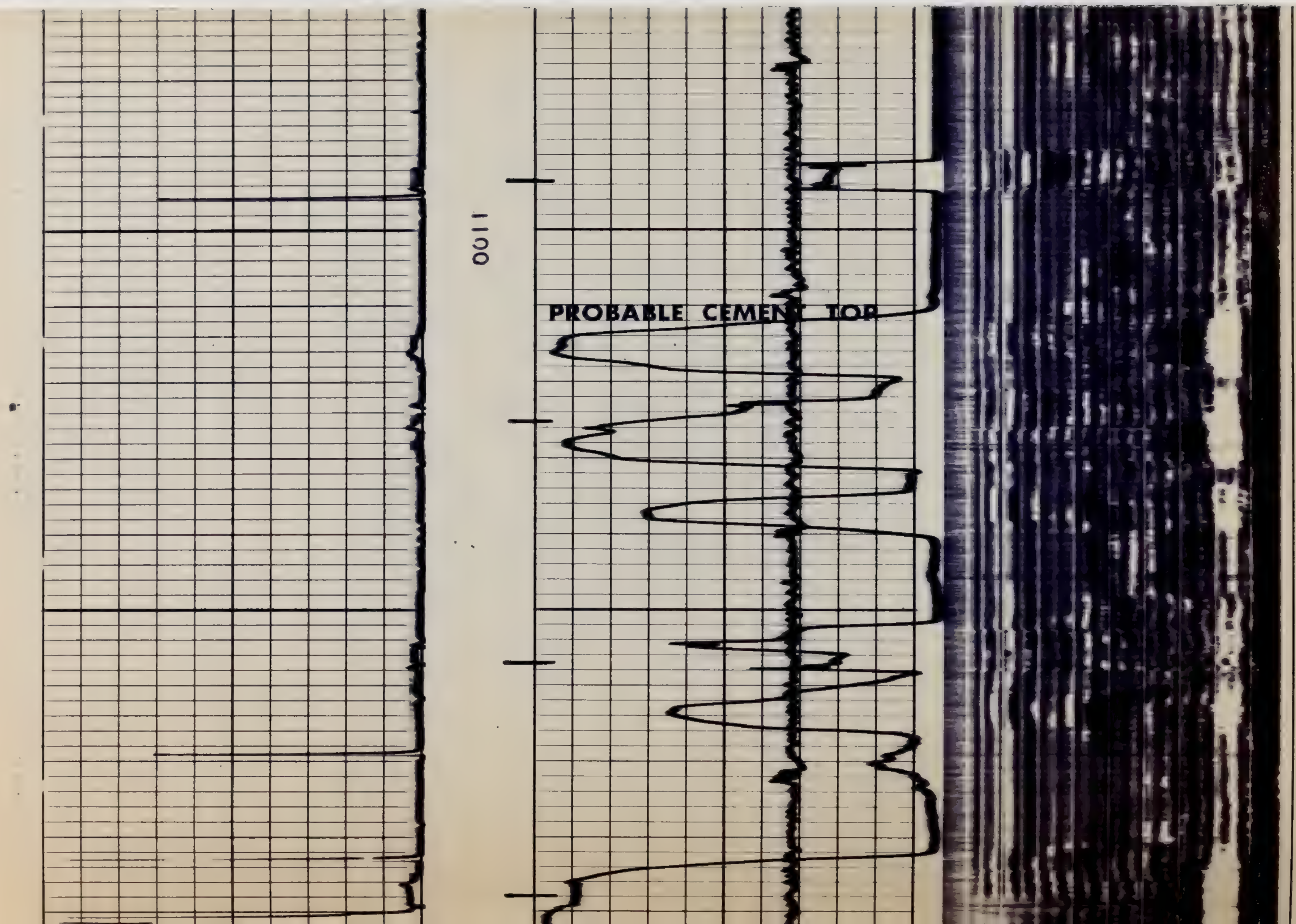

C
CALIBRATION STRING NO. 1
Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(15' Deep)

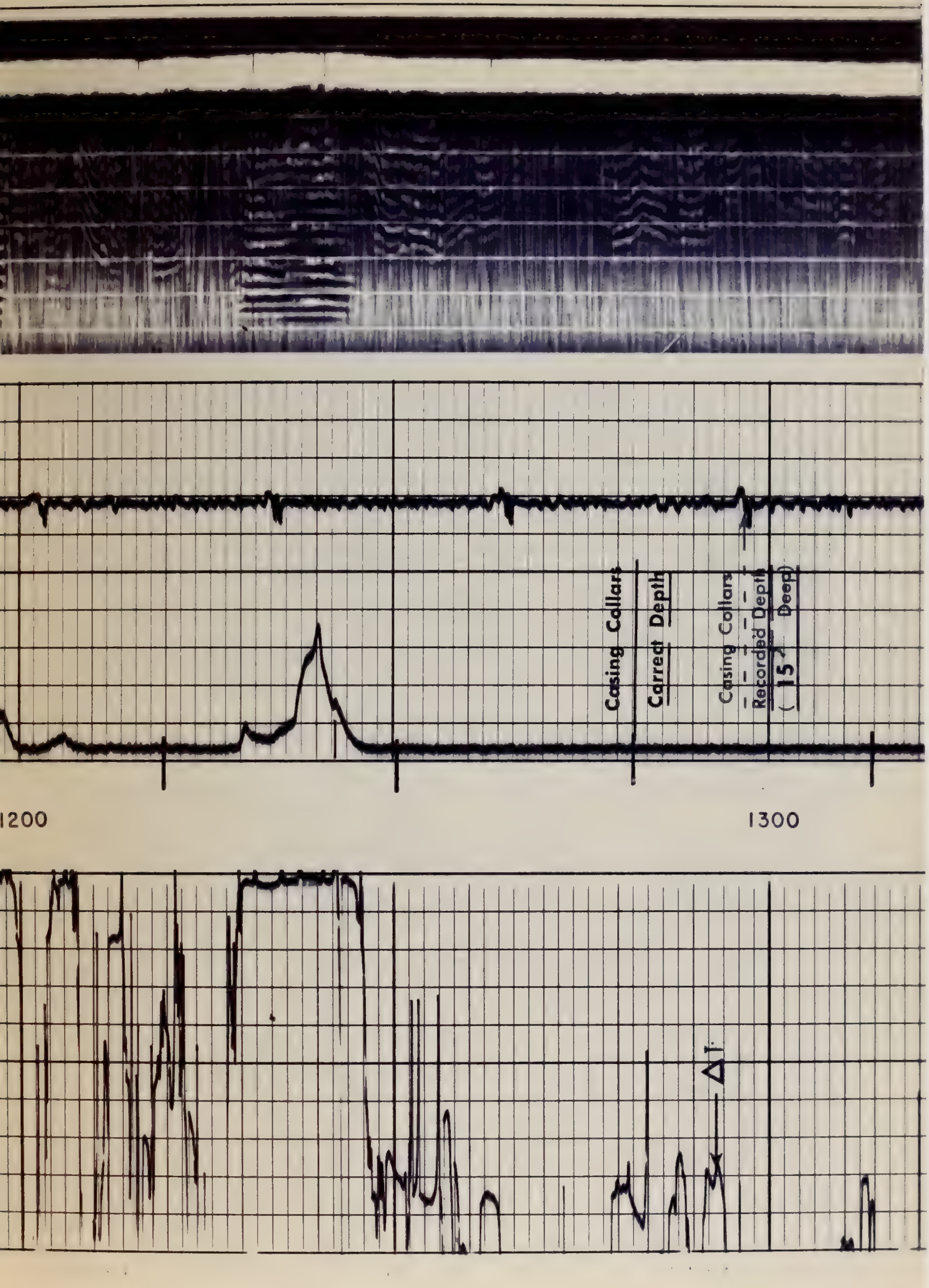

Amplitude
2100

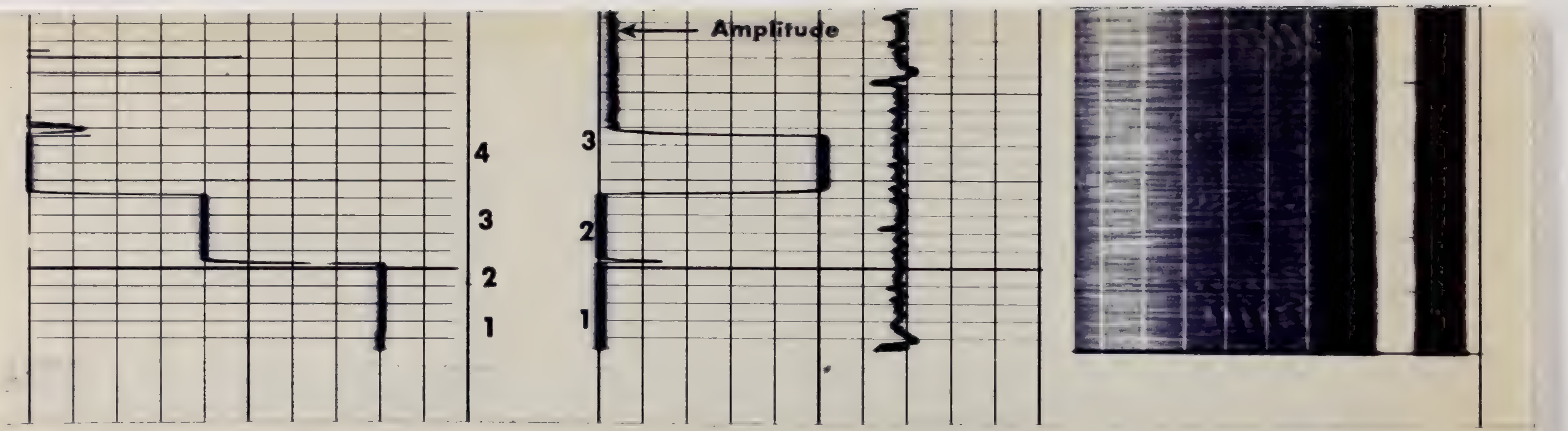

Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(15' Deep)
Amplitude
2200
3
2
1
4
3
2
1
Δ

REPEAT SECTION - NO.1 - LONG STRING

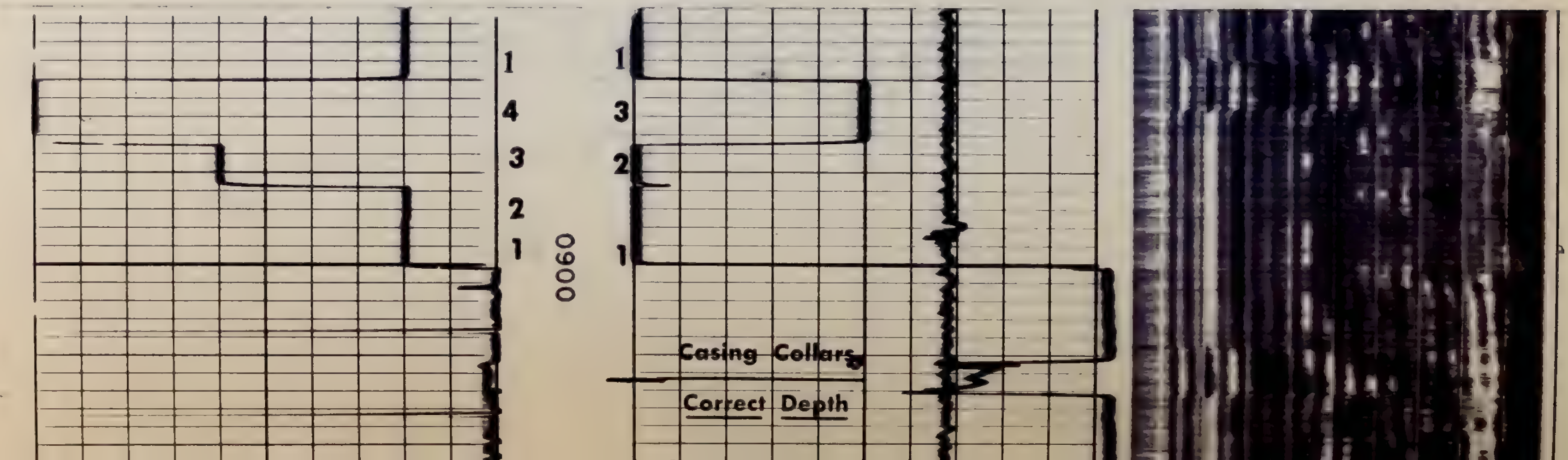


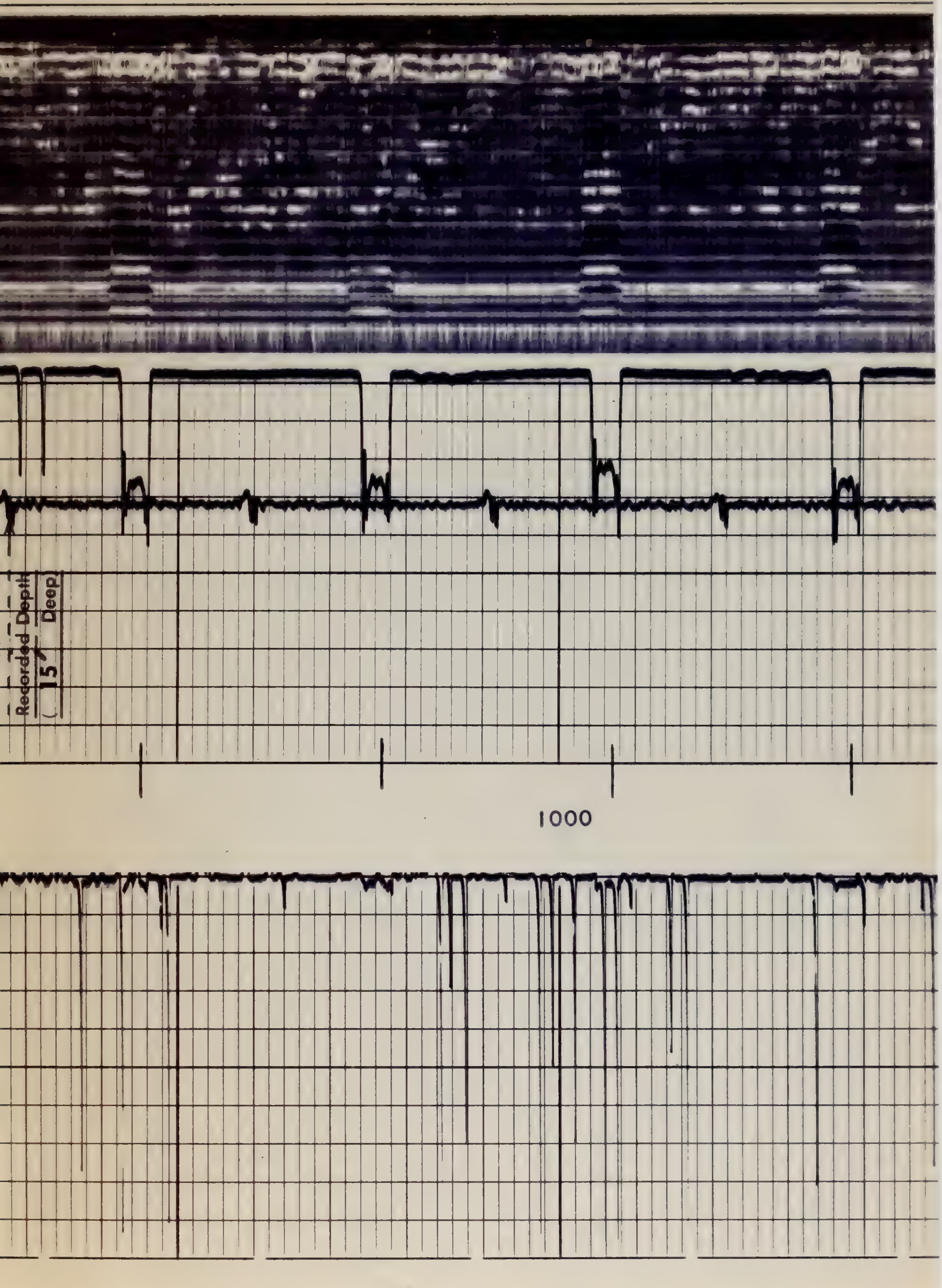

1100
PROBABLE CEMENT TOP

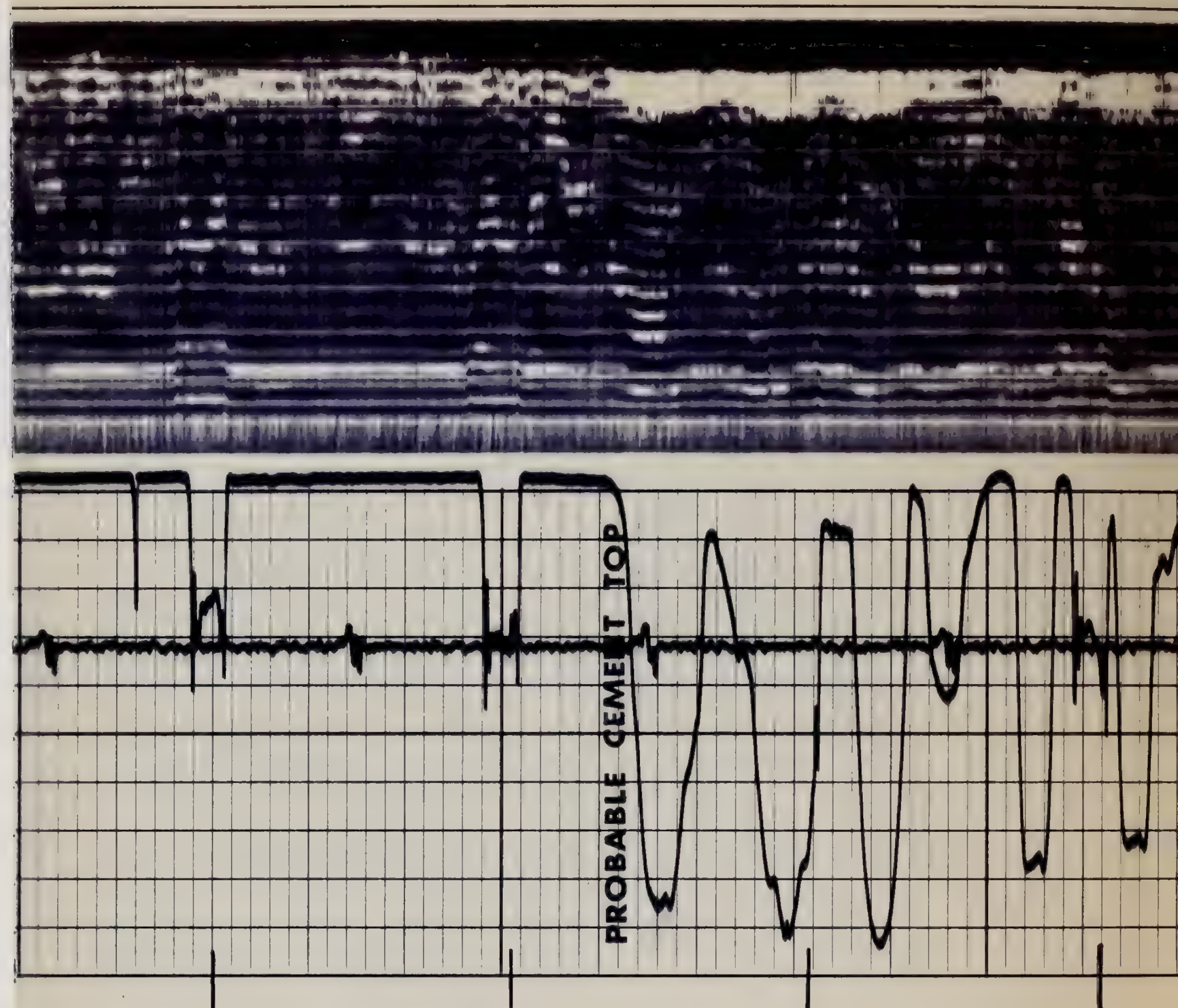

Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(15' Deep)
1200
1300
ΔT

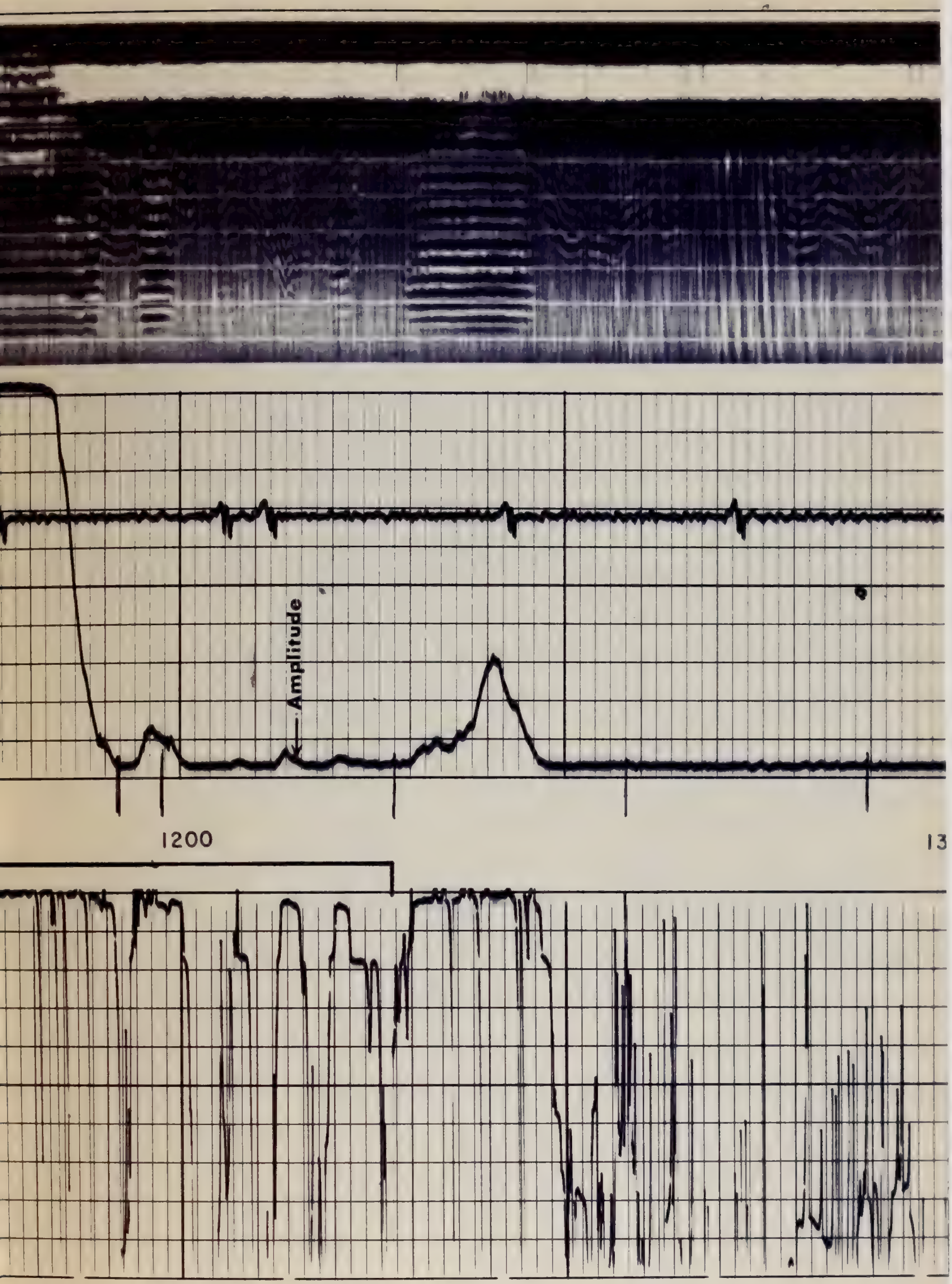


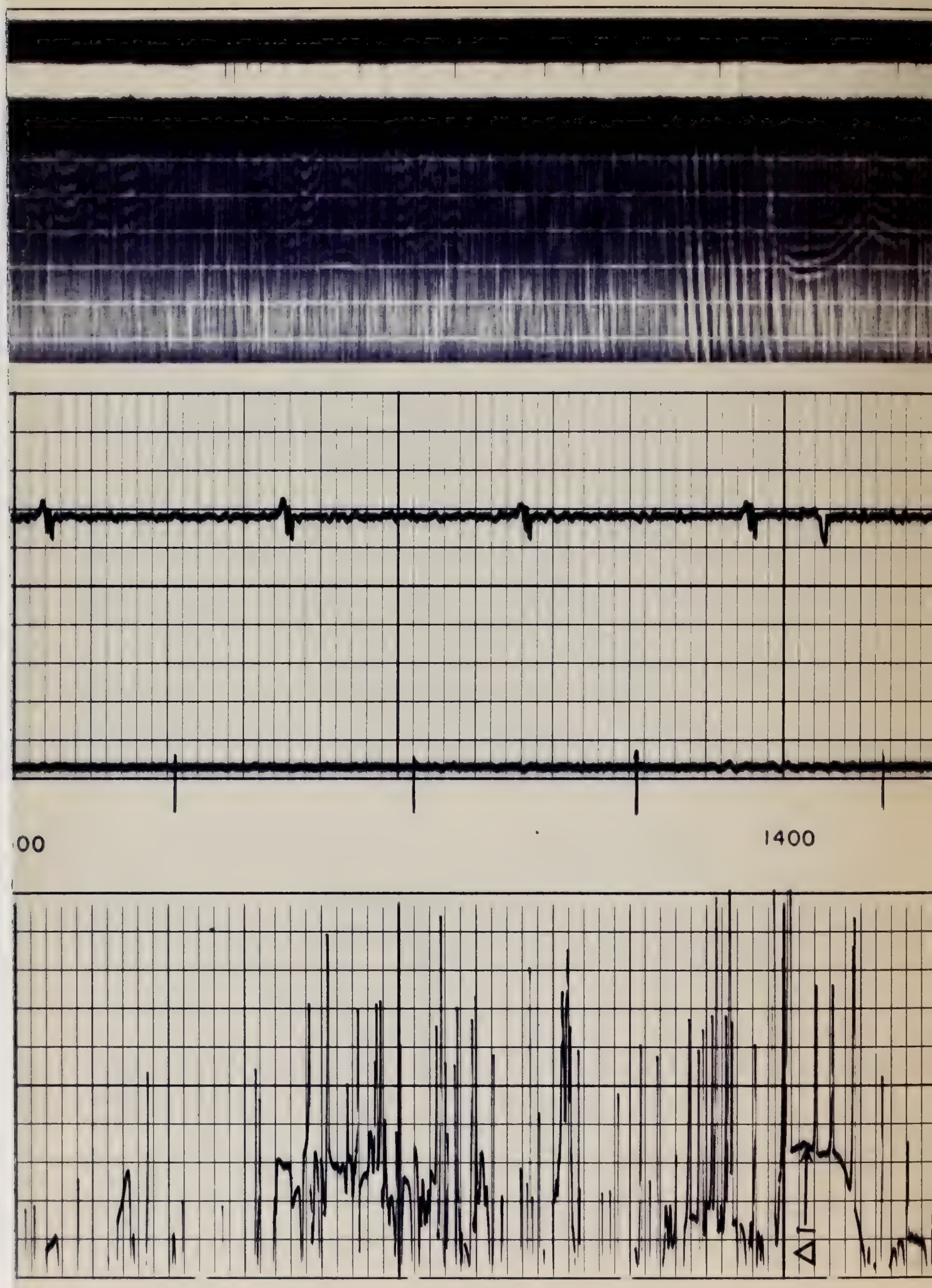
NO. 2 - SHORT STRING

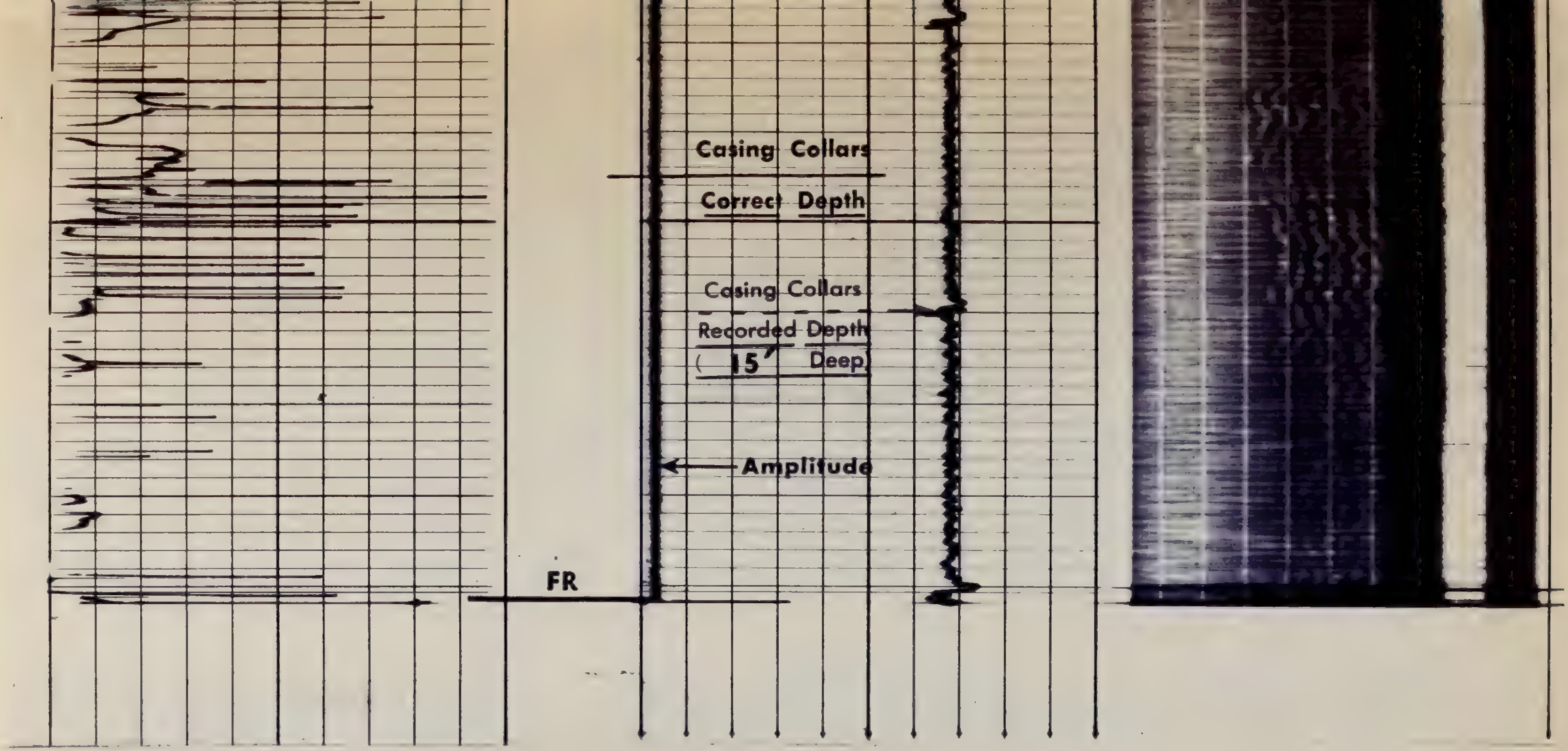



Recorded Depth
(15' Deep)
1000

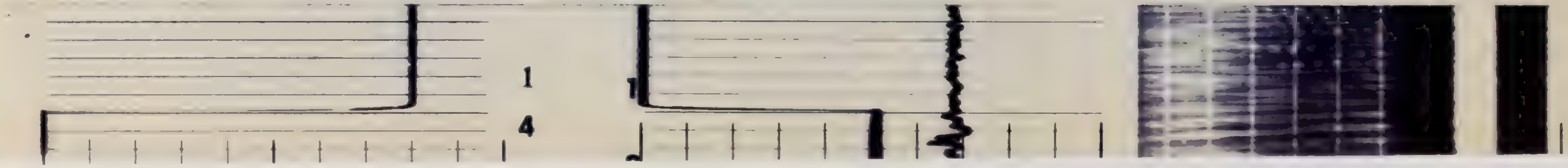

PROBABLE CEMENT TOP
1100
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH
1-11/16" HYPERDOME

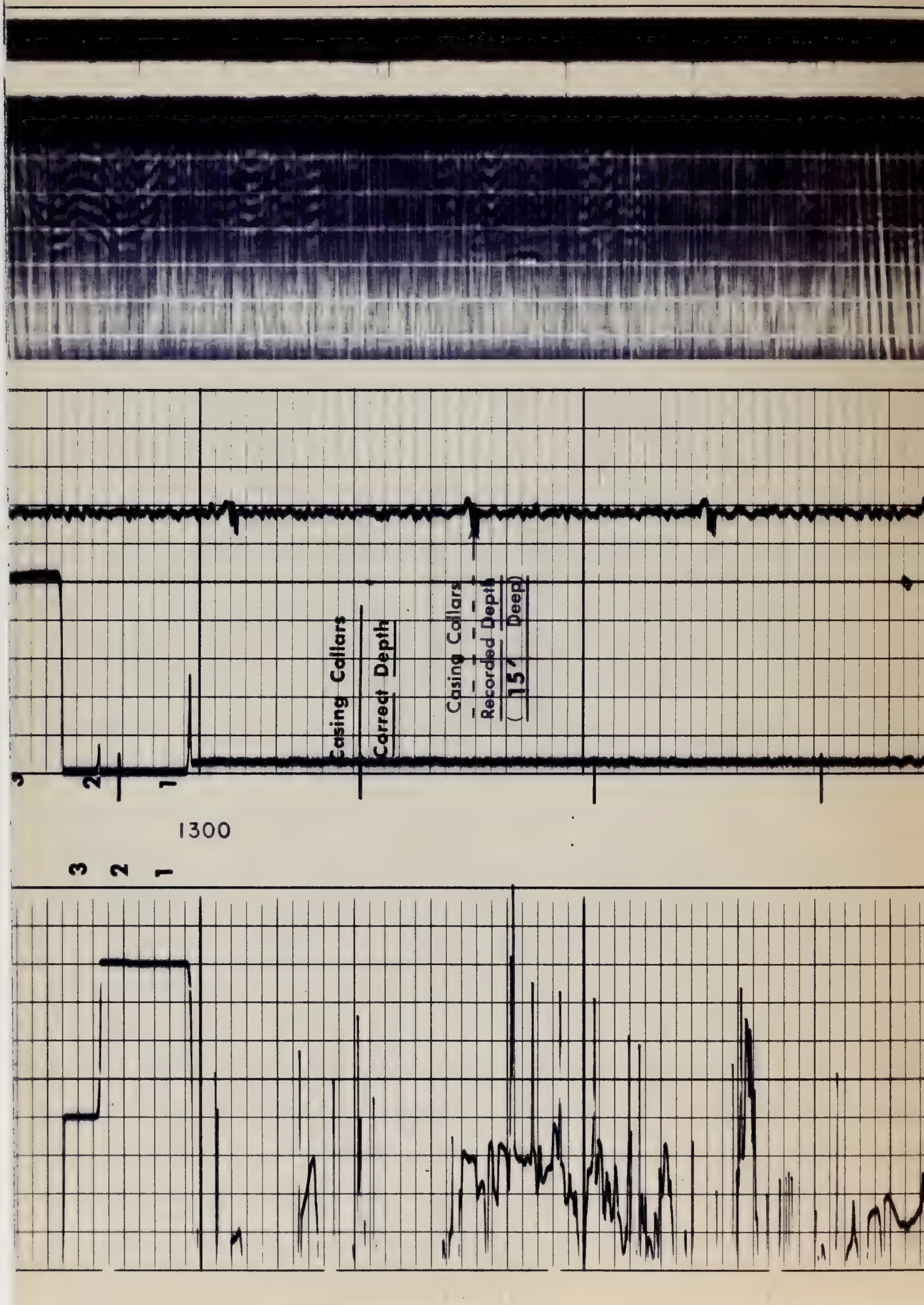

Amplitude
1200
13

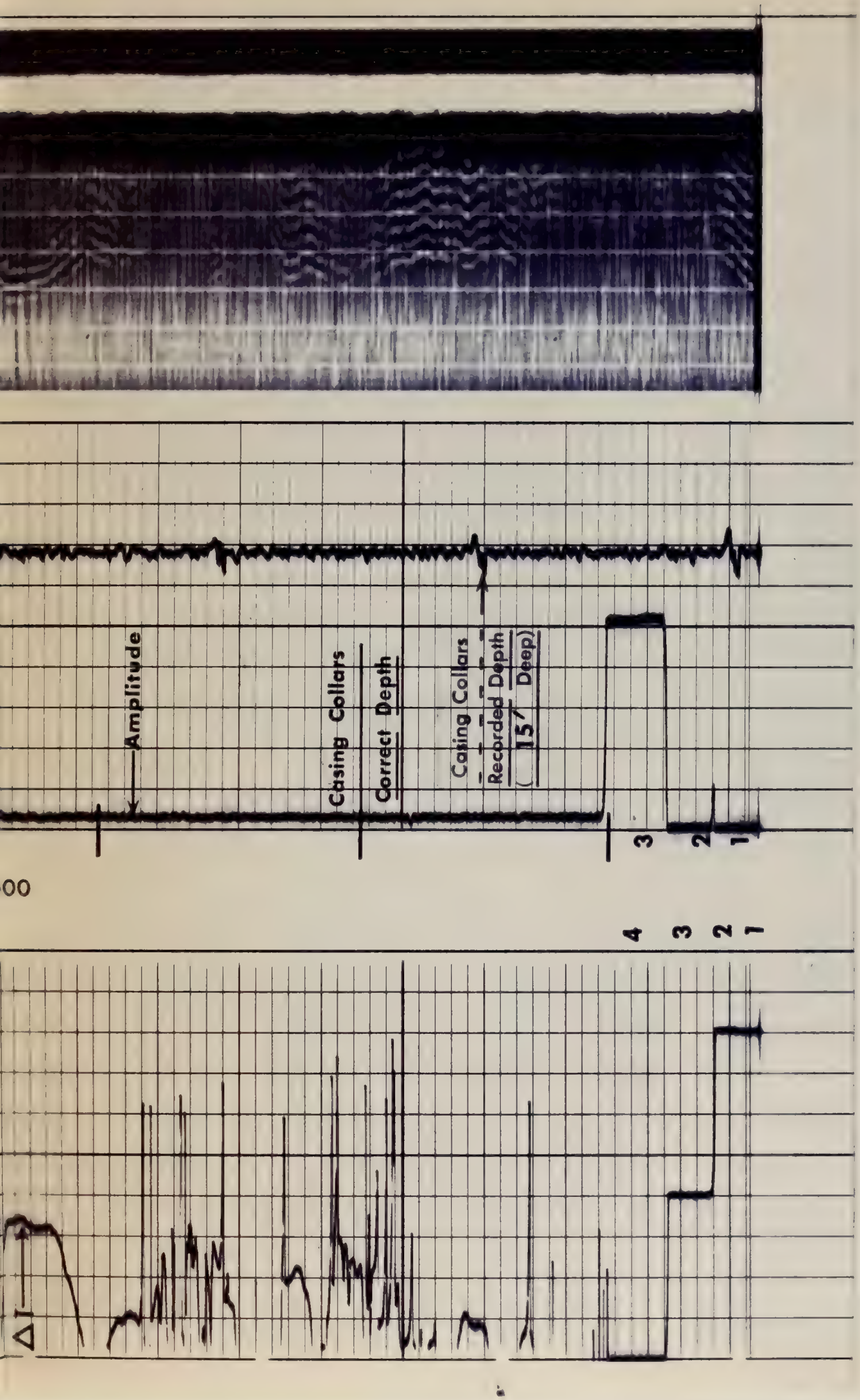

00
1400
ΔT



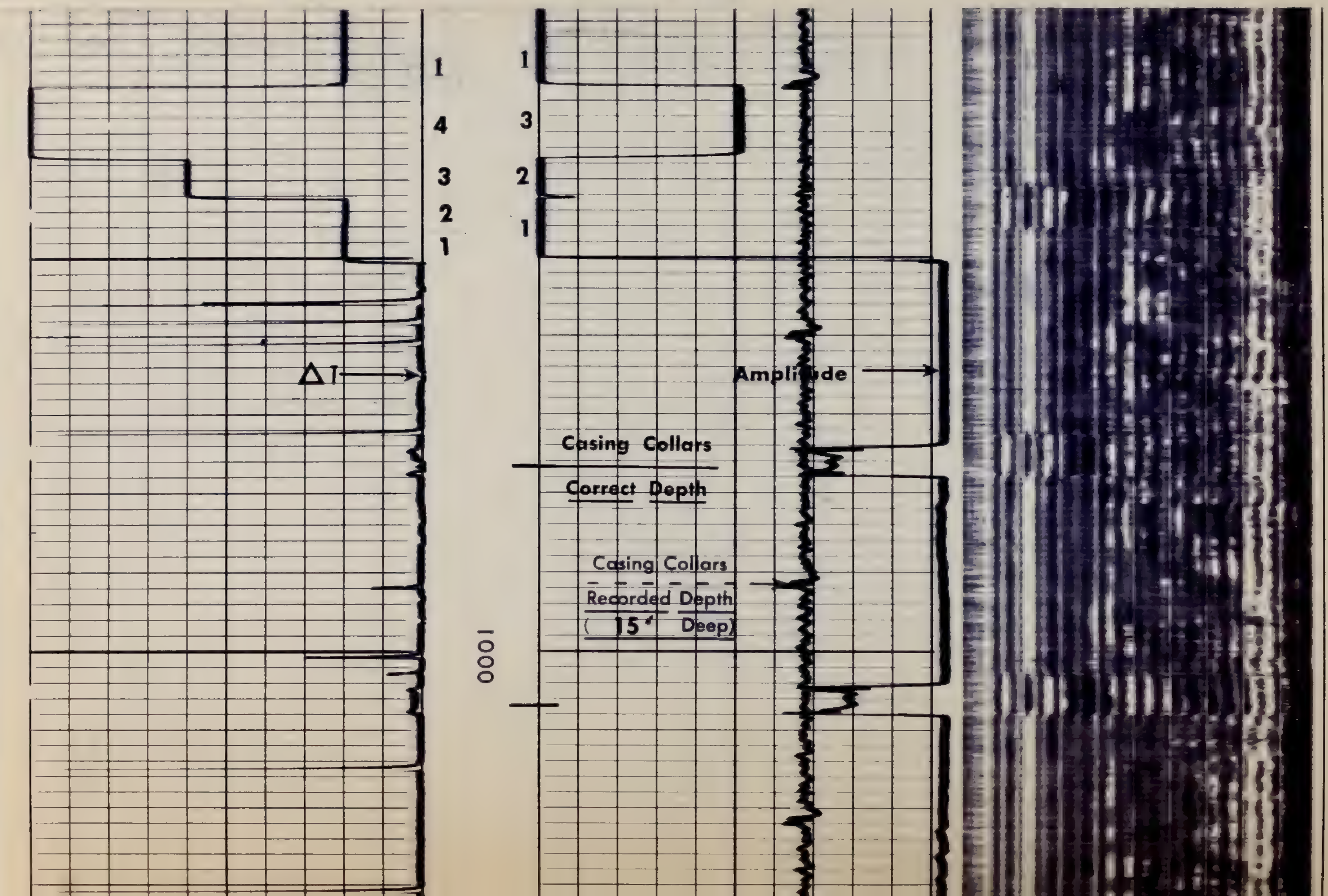
CALIBRATION RUN - NO. 2 - SHORT STRING

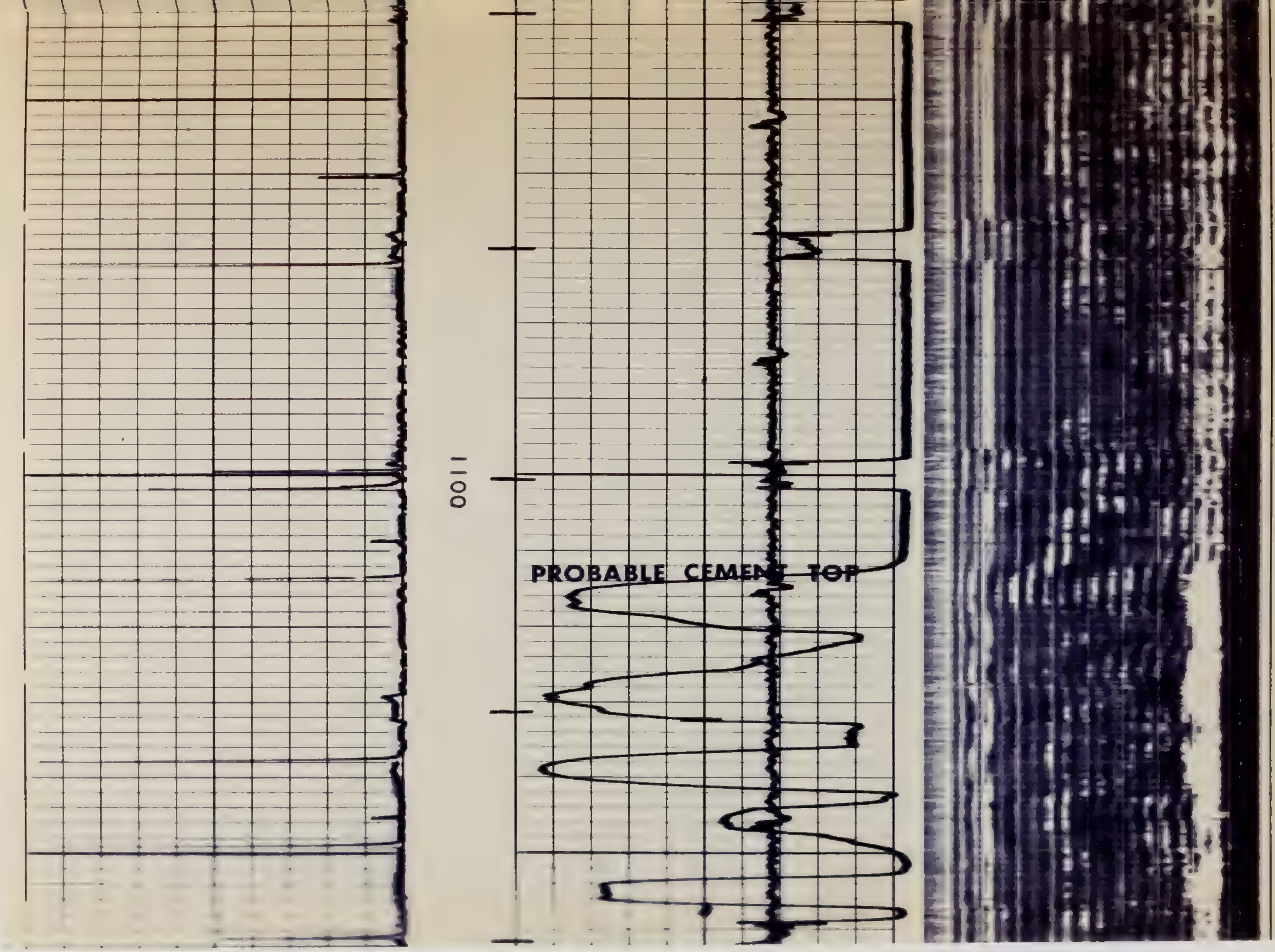


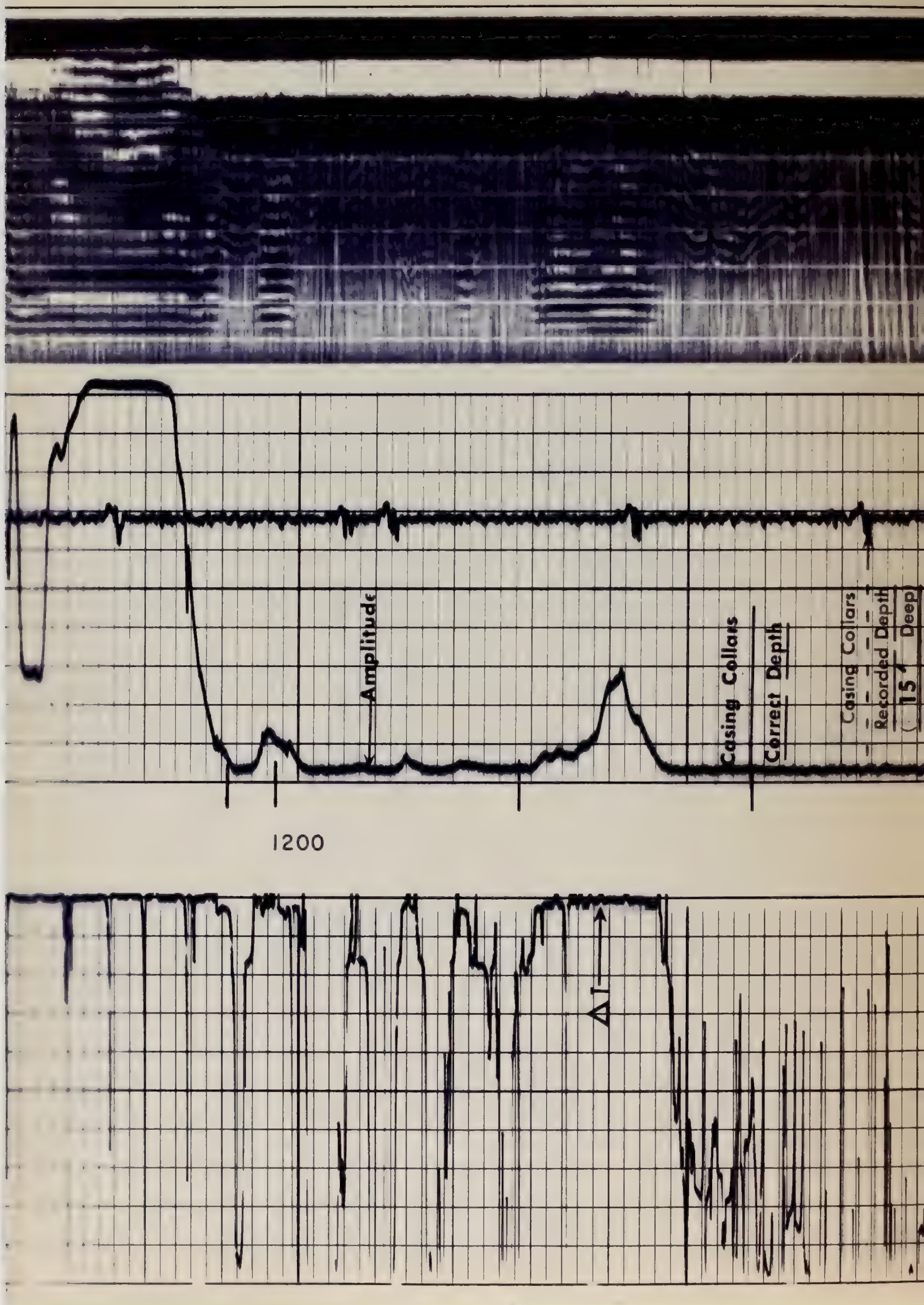

Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(15' Deep)
3
2
1
1300
3
2
1

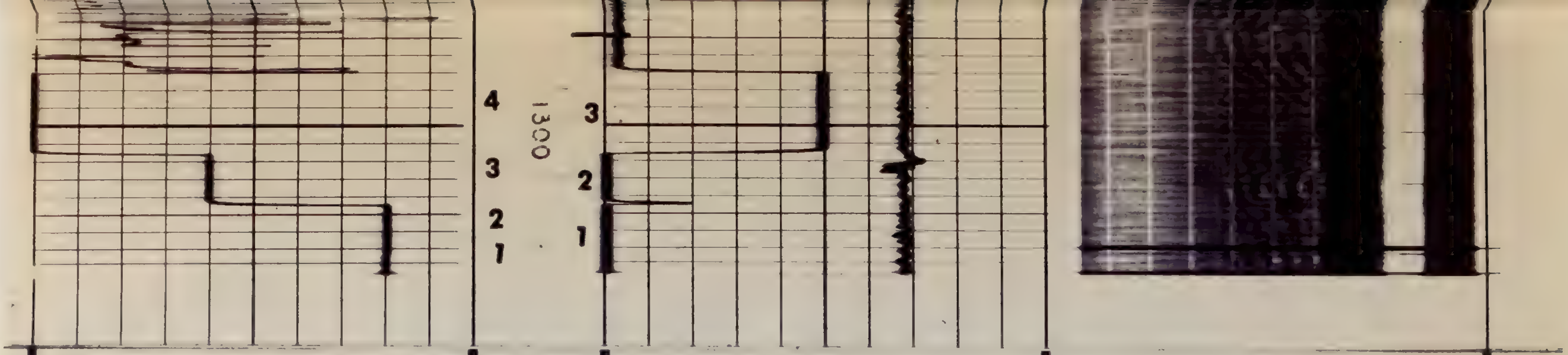

Amplitude
Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(15′ Deep)
ΔT
00
4
3
2
1
3
2
1

REPEAT SECTION - NO. 2 - SHORT STRING




1100
PROBABLE CEMENT TOP


Amplitude
Casing Collars
Correct Depth
Casing Collars
Recorded Depth
(15' Deep)
1200
ΔT



Casing Collars

Corrected Depth

DEPTH

TRANSIT TIME

MICROSECONDS 200 SPACING

400 - - - - - - - - - - - - - - - - 200

CASING BOND

MILLIVOLTS

0 100

VARIABLE DENSITY

MICROSECONDS 5 FT. SPACING

200 1200

COMPANY ATLANTIC RICHFIELD COMPANY

WELL S.G. NO.17

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 2277-1495
SCHL. TD 2285-1503
DRLR TD 2305-1490
Elev:
KB ----
DF ----
GL 7036

CEMENT BOND CALIBRATION CODING

	Δt	AMPLITUDE
1.	MECHANICAL ZERO	MECHANICAL ZERO
2.	240 μ sec	ELECTRICAL ZERO
3.	320 μ sec	CALIBRATE
4.	400 μ sec	

COUNTY RIO BLANCO

Schlumberger

ORIENTED PERFORATING RECORD AND CASING COLLAR LOG

COUNTY RIO BLANCO
FIELD or LOCATION SORGHUM GULCH
WELL S.G. NO. 17
COMPANY ATLANTIC RICHFIEL COMPANY

COMPANY ATLANTIC RICHFIELD COMPANY

WELL S.G. NO. 17

FIELD SORGHUM GULCH

COUNTY RIO BLANCO **STATE** COLORADO

Location: 436' FWL & 181' FSL

Sec. 16 **Twp.** 3S **Rge.** 46 W

Other Services:
CBL-VDL-1
CBL-VDL-2
PDC-GR-1
PDC-GR-2

Permanent Datum: GROUND LEVEL **; Elev.:** 7036
Log Measured From GL **,** 0 **Ft. Above Perm. Datum**
Drilling Measured From GL

Elev.: K.B. ----
D.F. ----
G.L. 7036

Date	2-23/3-2-75
Run No.	ONE
Pipe String No.	1-2
Pipe String Ident.	LONG-SHORT
Type Orienting	POWERED
Type fluid in hole	WATER
Salinity, PPM Cl.	-----
Density	-----
Level	FULL
Max rec. temp., deg F.	-----
Operating rig time	68 HOURS
Recorded by	ST. AUBYN
Witnessed by	MR. TAIT

BORE-HOLE RECORD			CEMENTING RECORD				
Bit	From	To		Type	Wgt.	From	To
6 3/4	56	2460	Primary	HOWCO		2335	1110
				THIXATROPER			
			Squeeze				

The well name, location and borehole reference data were furnished by the customer.

FOLD HERE

WS-1521-A

EQUIPMENT DATA

Hoist Truck No.	3862	Rotator Size	1 11/16
Inst. Truck No.	3862	Rotator No.	51
Tool Serial No.	47	Indexer Type	POD-D
Location	VERNAL	Indexer No.	51

DEPTHS RELATE TO

Radioactivity Measurements ☒
Schlumberger Line Measurements ☐

CASING COLLARS

PERFORATING DATA / LOGGING DATA

Depths From	Depths To	No. Shots	Gun Size	Gun Type	Time Const.	Sens. Setting	Zero Shift	Calib. Sens.	Calib. Defl.
1292	1492	201	1 11/16	HD	NO.1	LONG	STRI	NG	
1510	1550	41	1 11/16	HD	NO.1	LONG	STRI	NG	
1584	1624	41	1 11/16	HD	NO.1	LONG	STRI	NG	
1660	1820	161	1 11/16	HD	NO.1	LONG	STRI	NG	
1972	2234	227	1 11/16	HD	NO.1	LONG	STRI	NG	
1080	1220	141	1 11/16	HD	NO.2	SHT	STRI	NG	

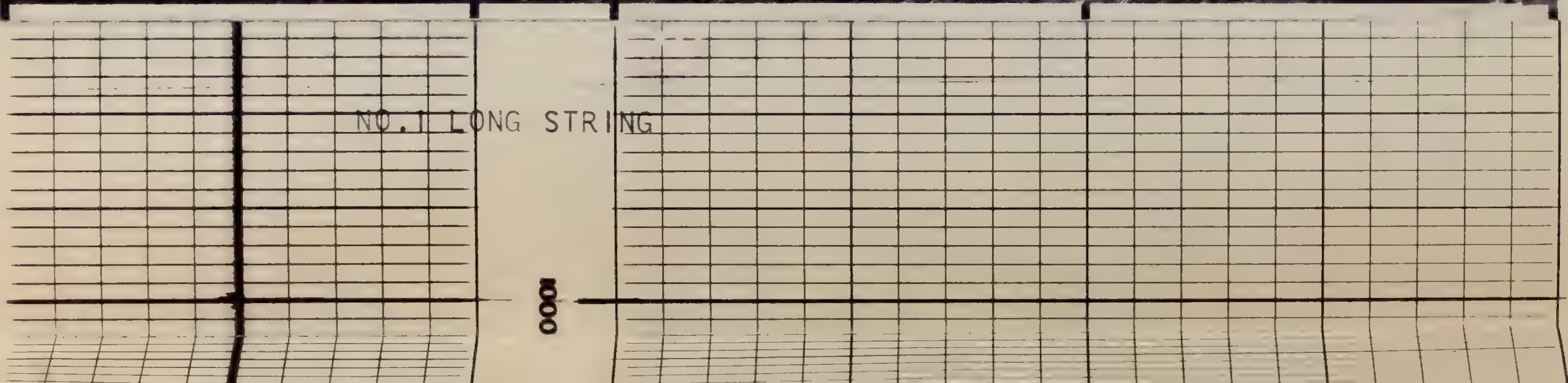
PIPE STRING RECORD

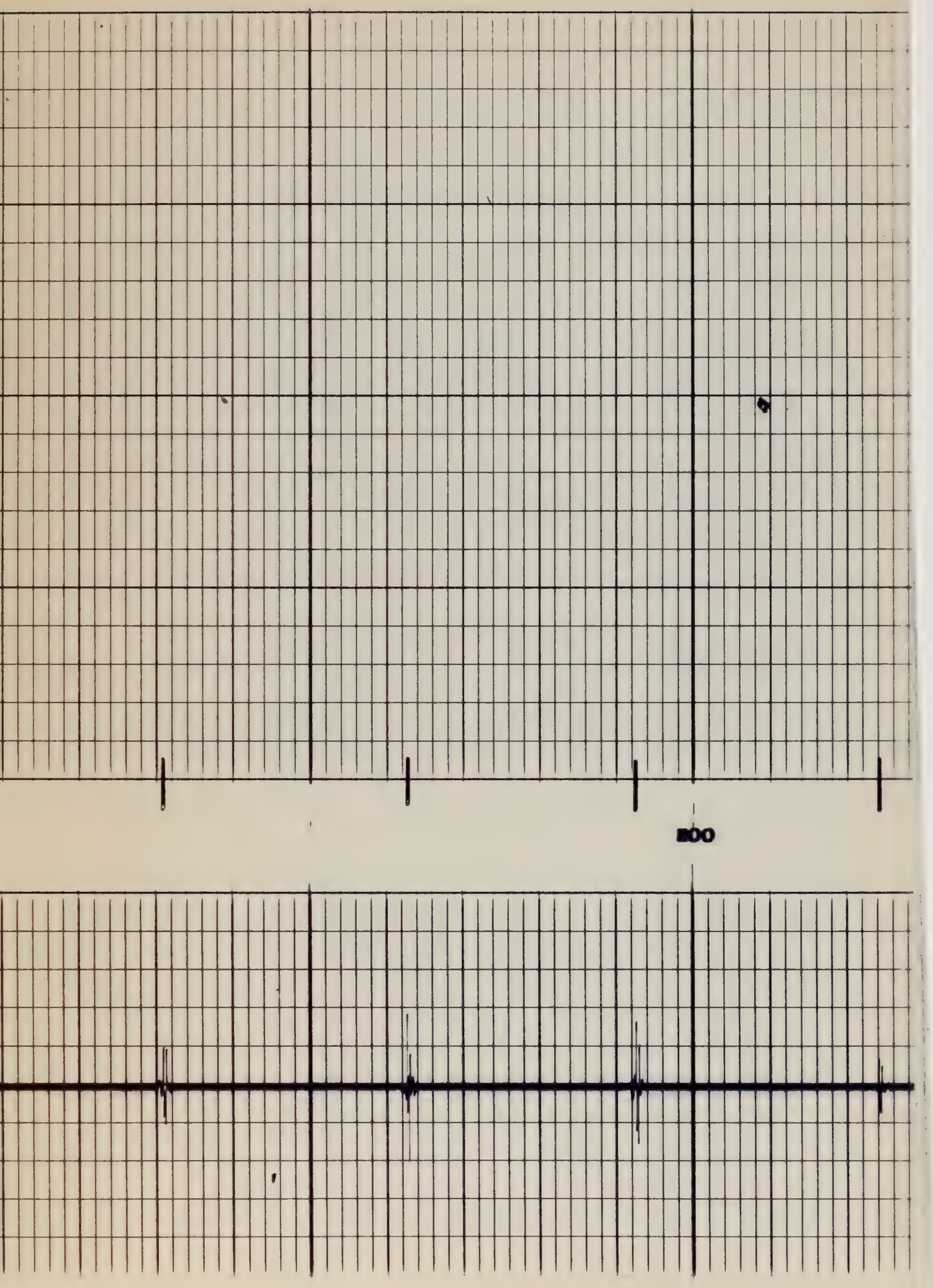
Number	1	2	3	4
Identific't'n	LONG	SHORT		
Size	2 3/8	2 3/8		
Weight	4.7	4.7		
Depth	2335	1503		

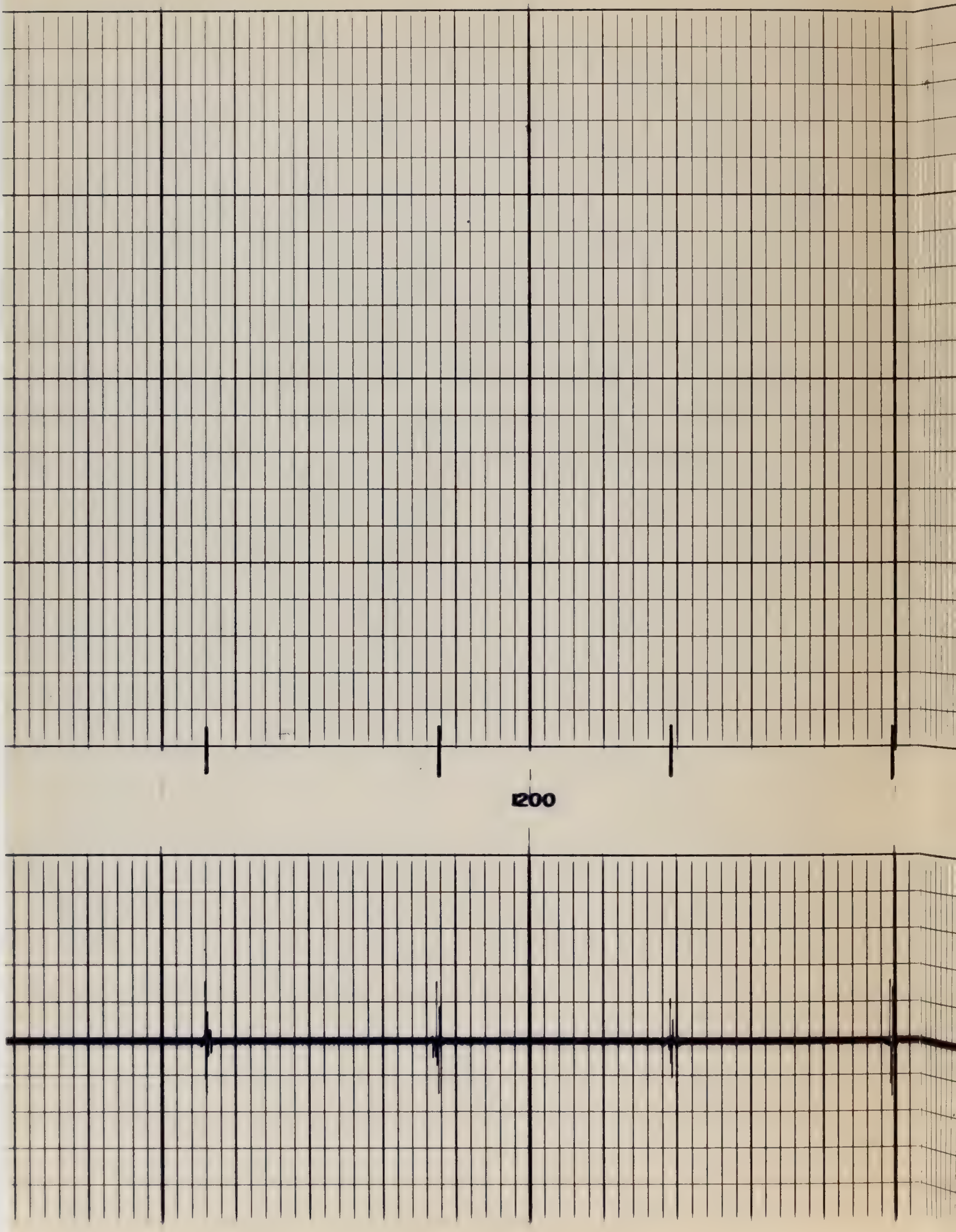
Remarks:

CASING COLLAR LOG
BEFORE PERFORATION

DEPTHS



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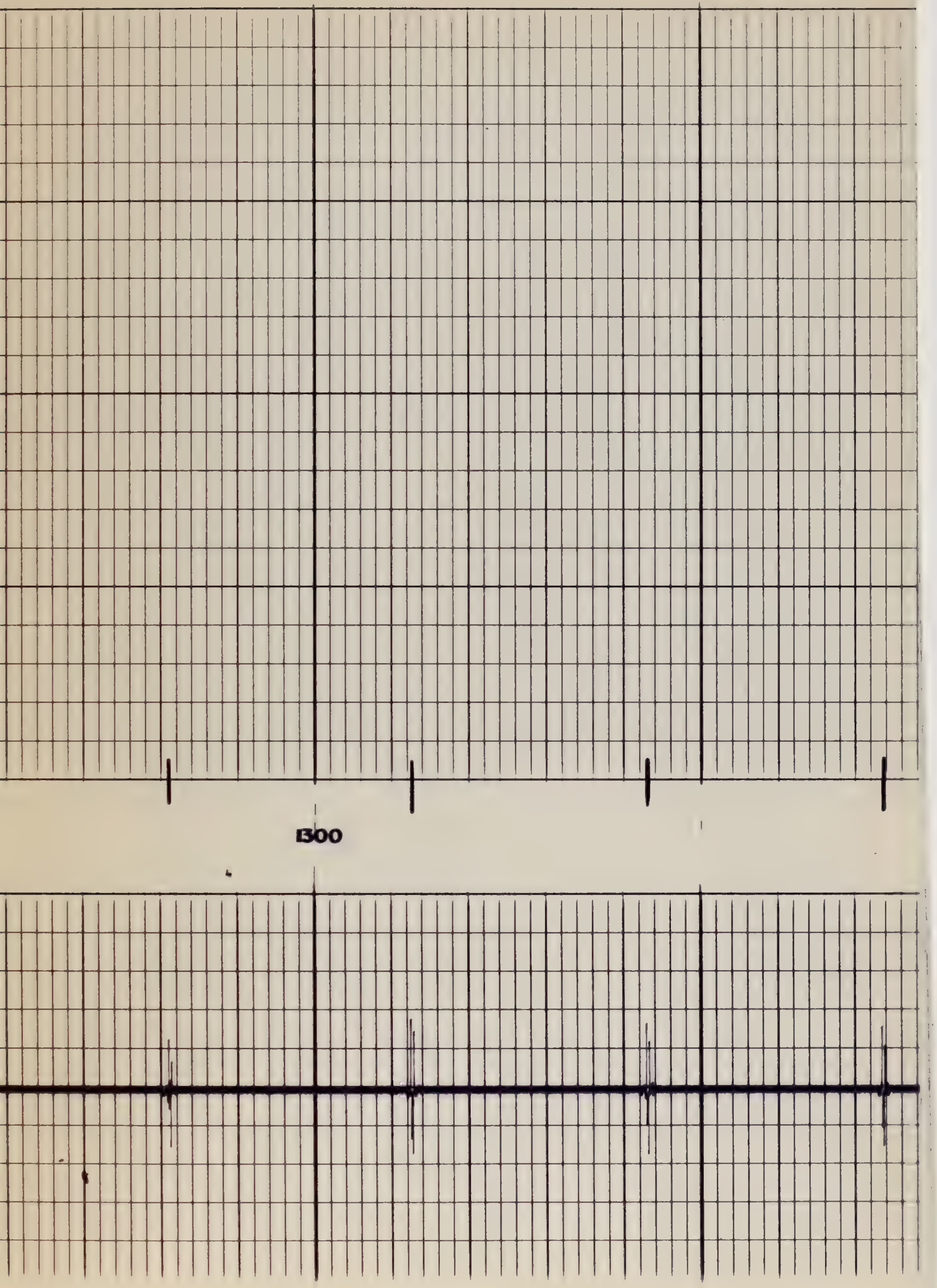
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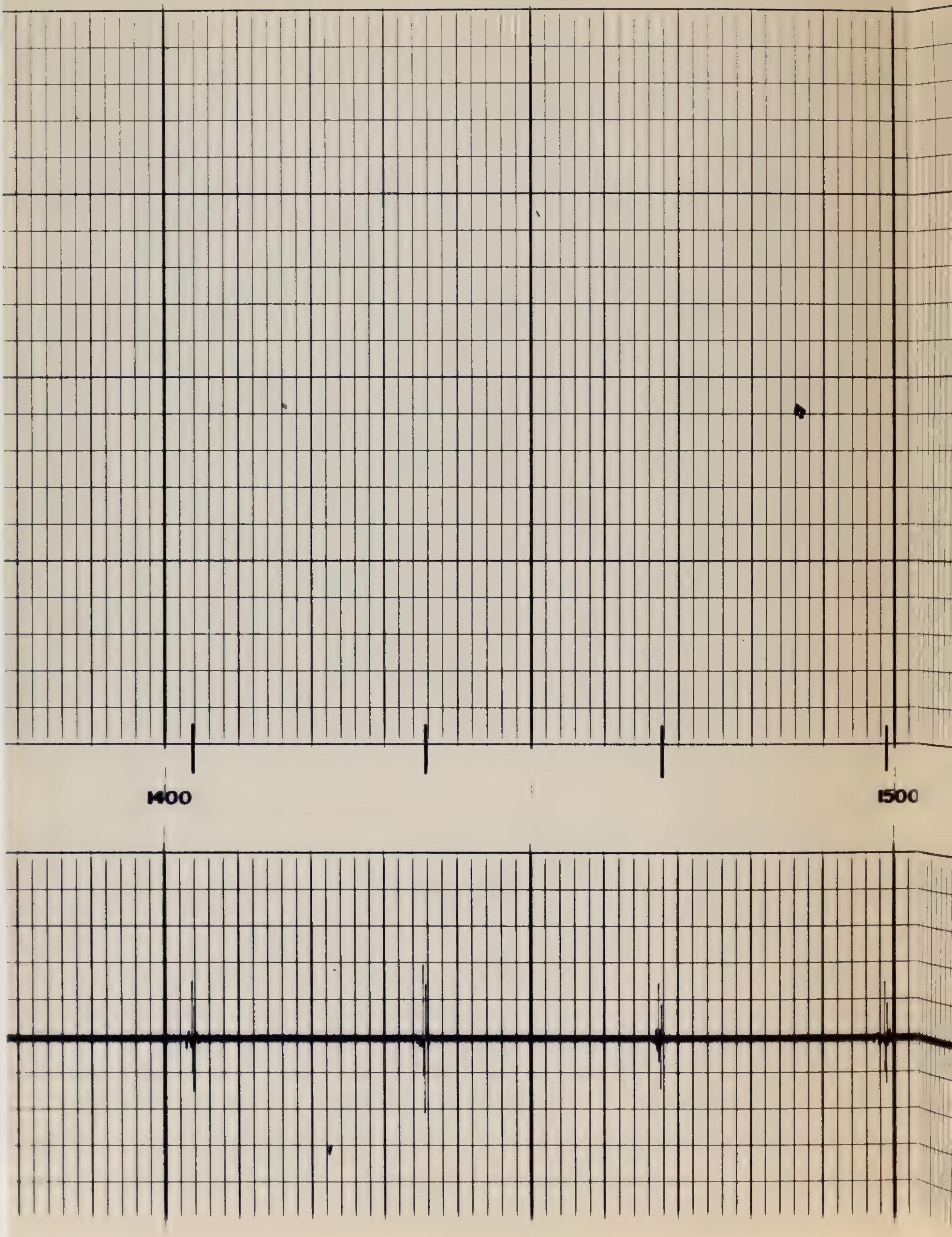
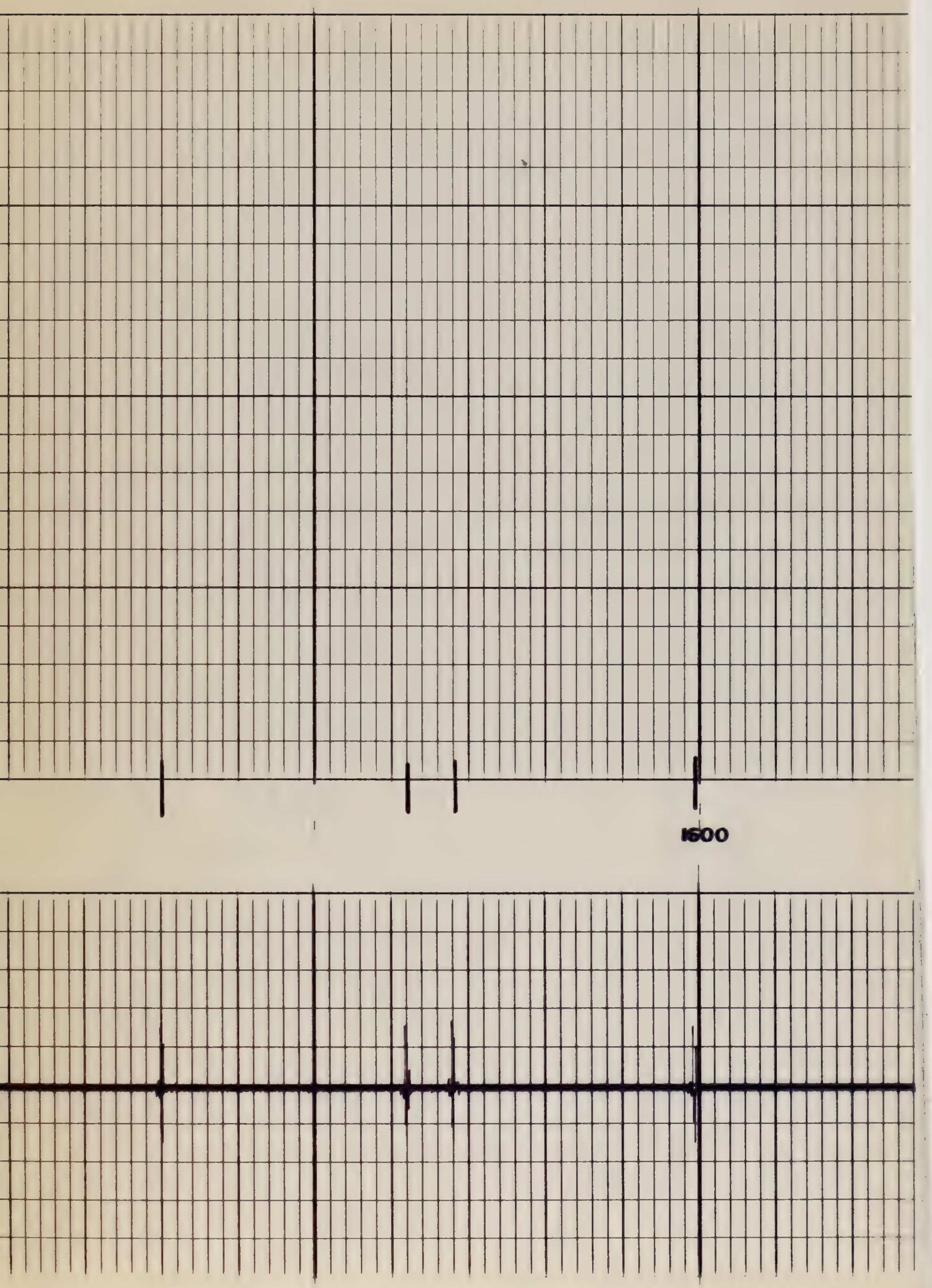

1400
1500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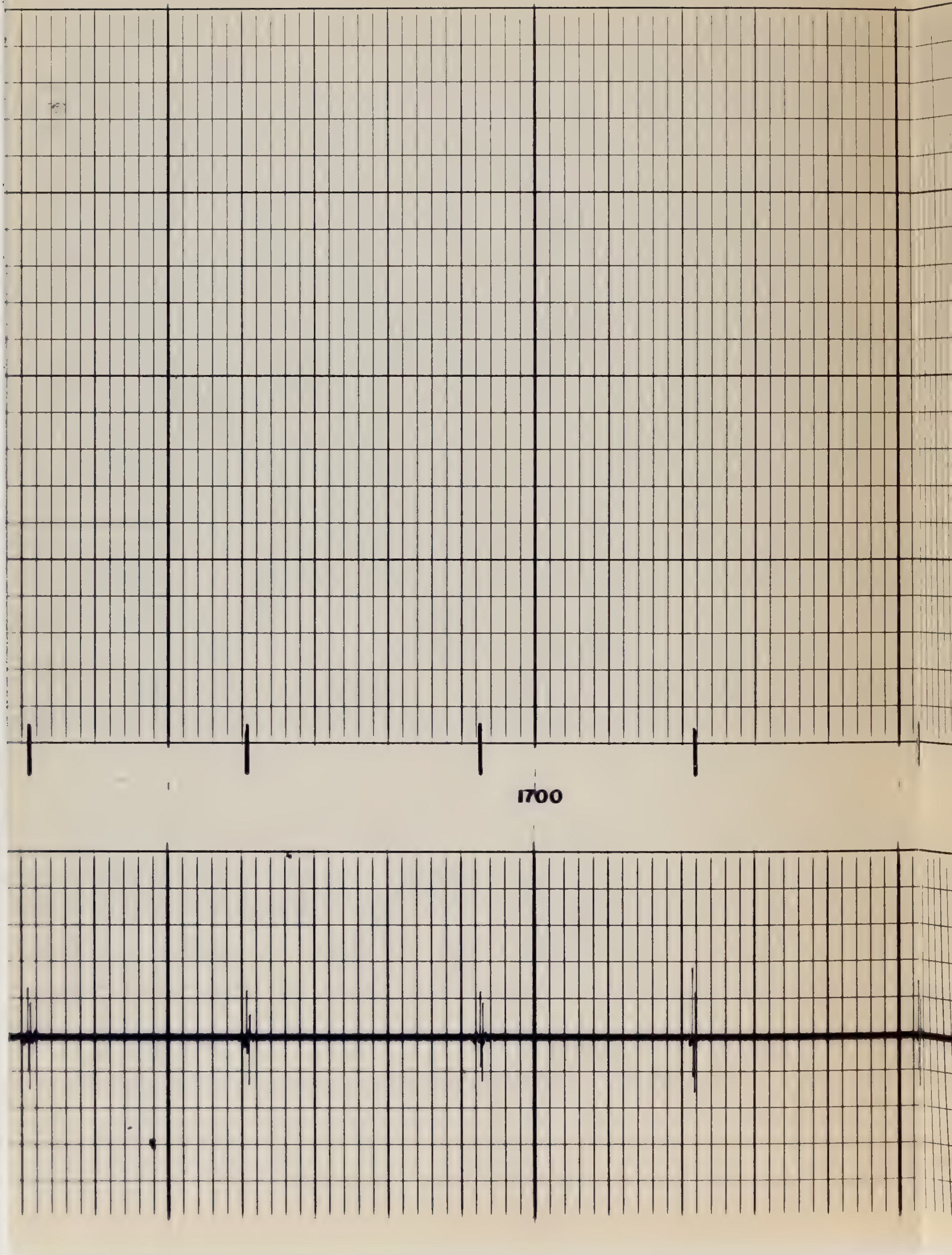
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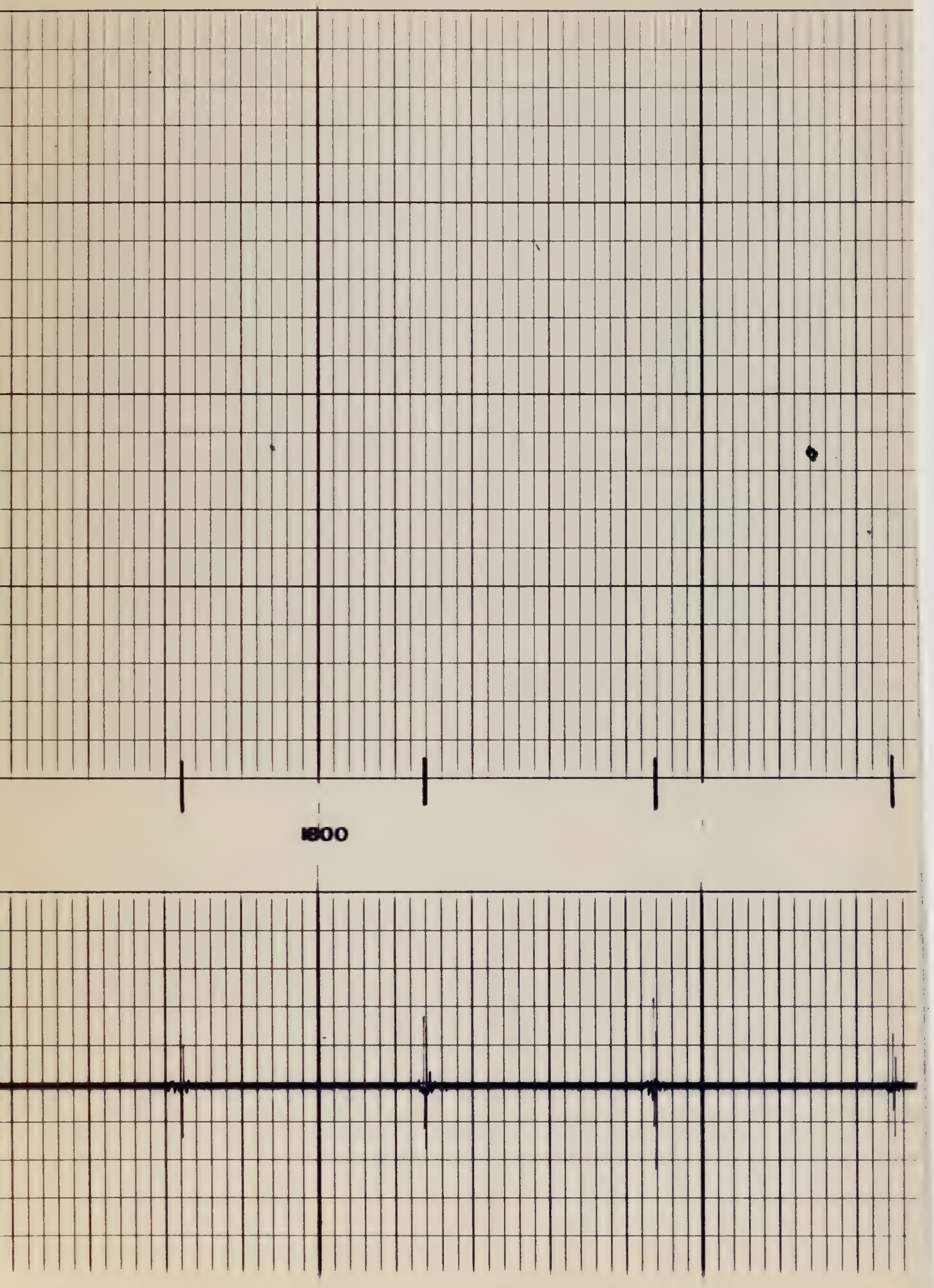
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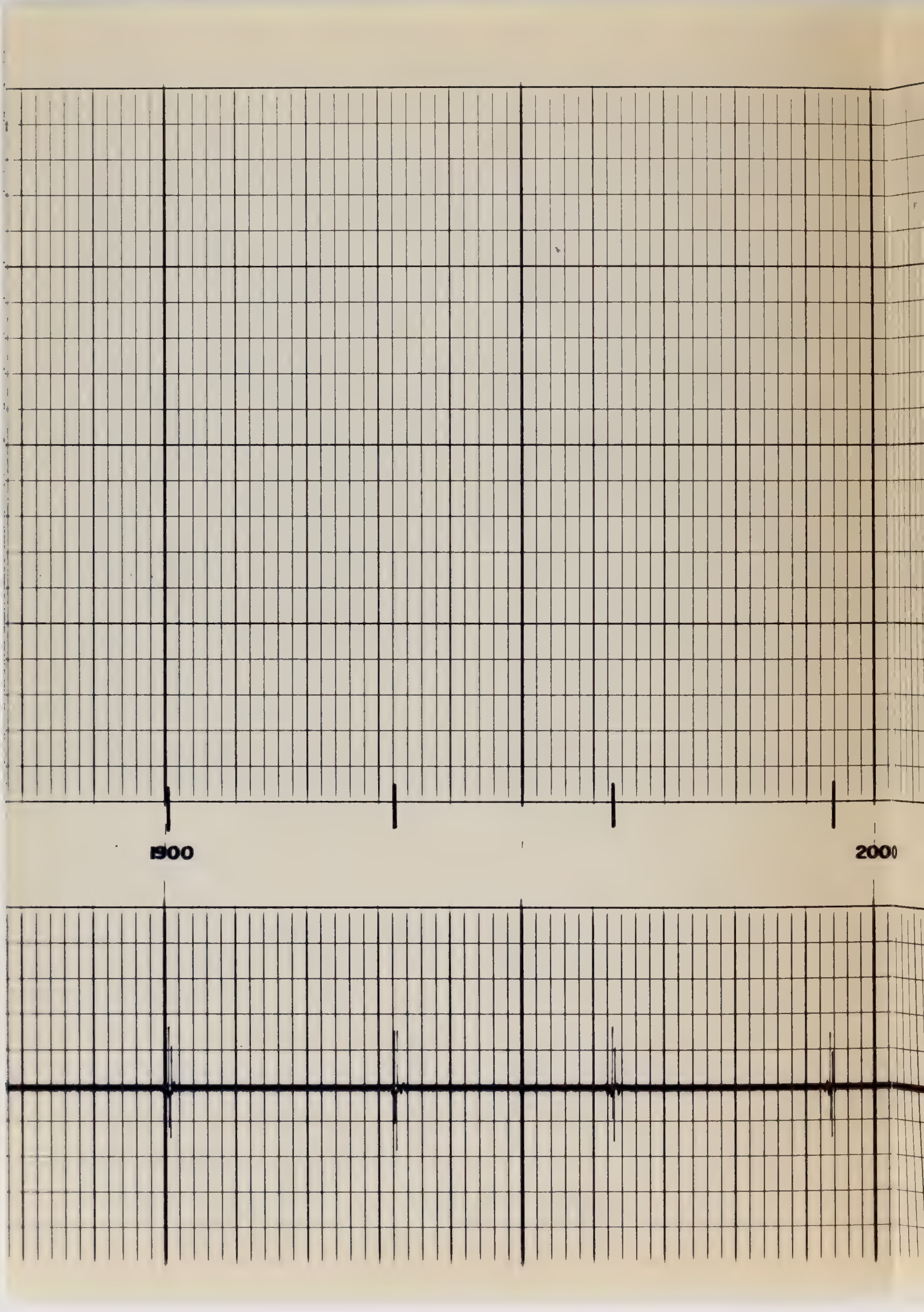
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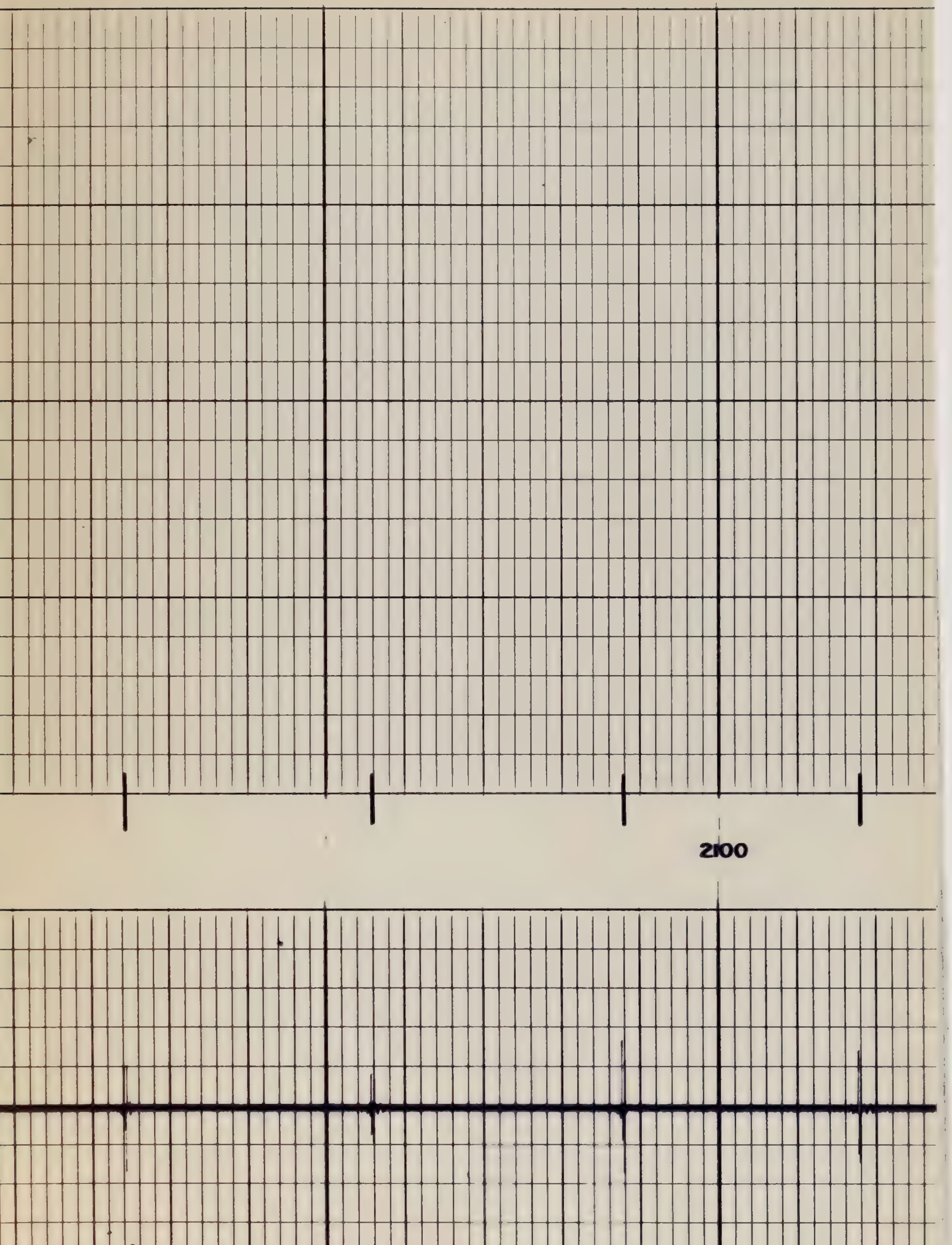
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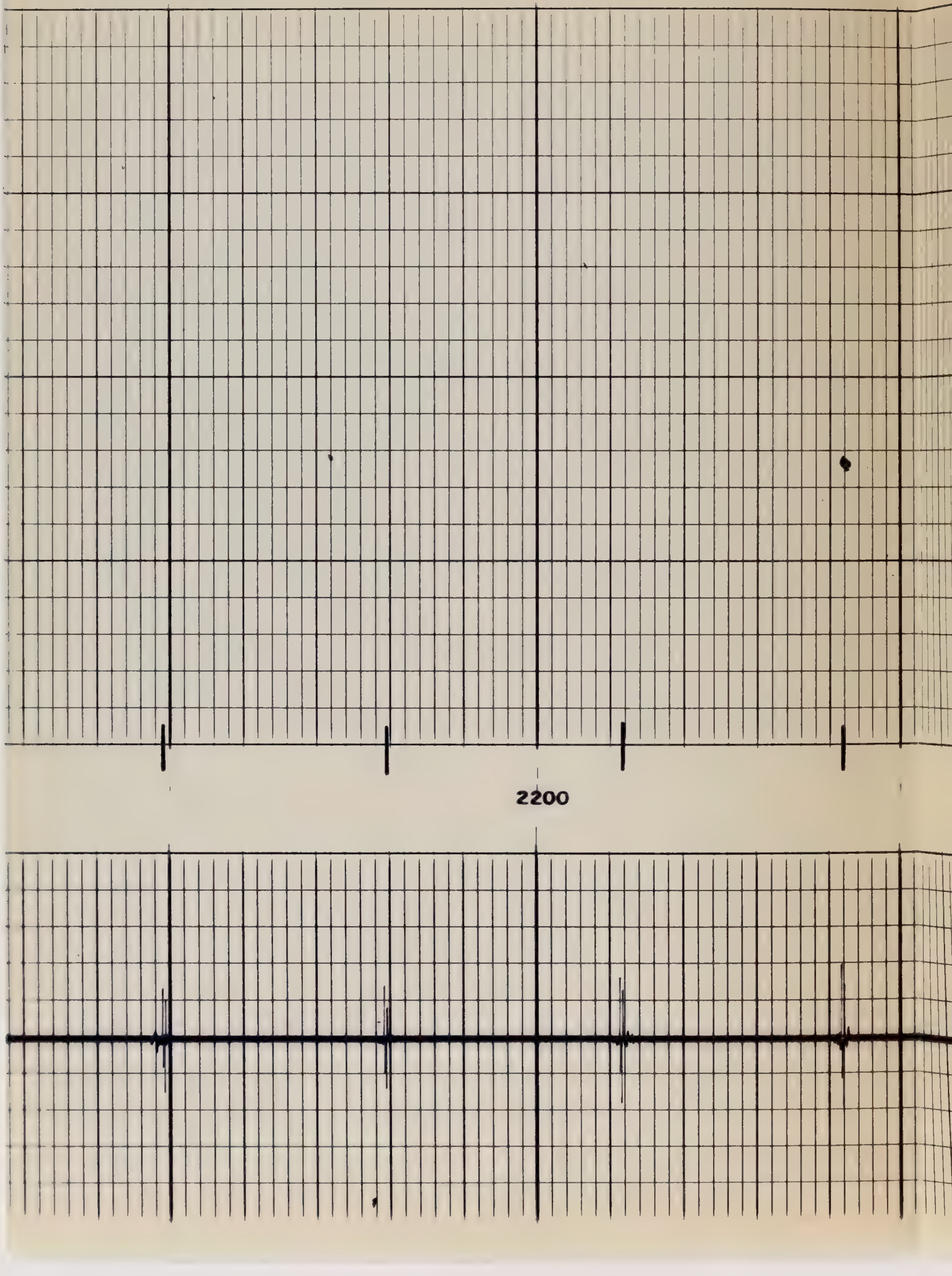
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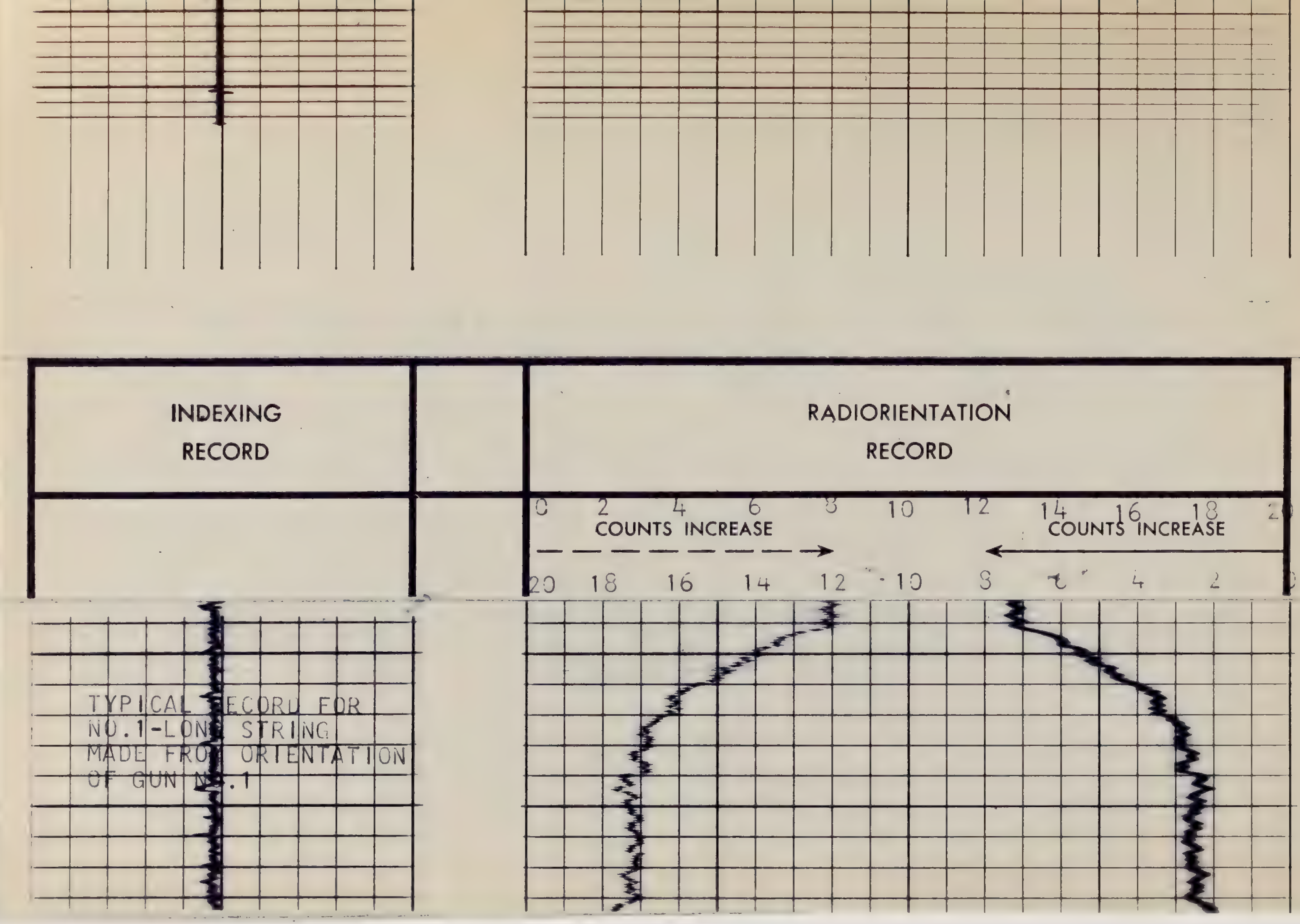
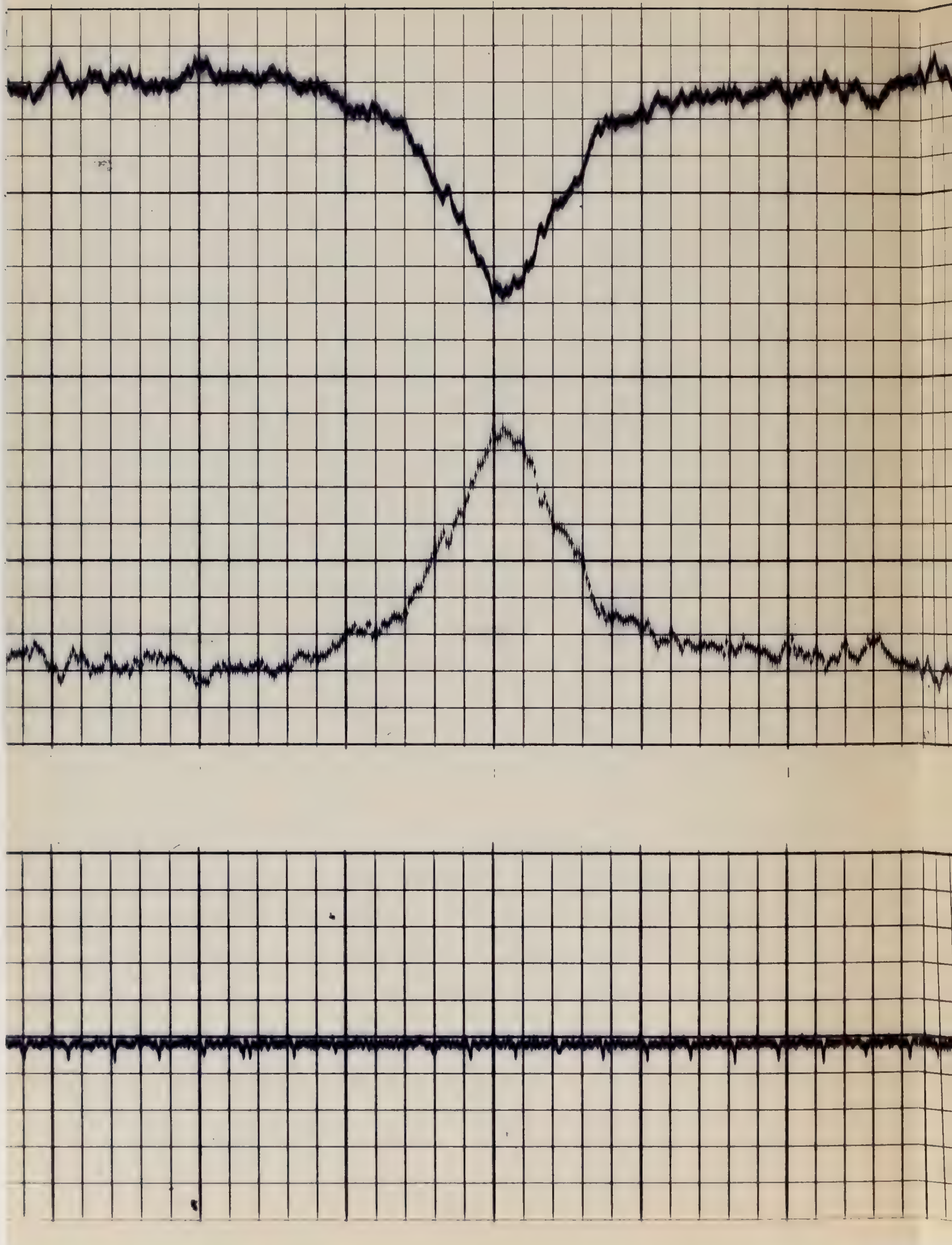
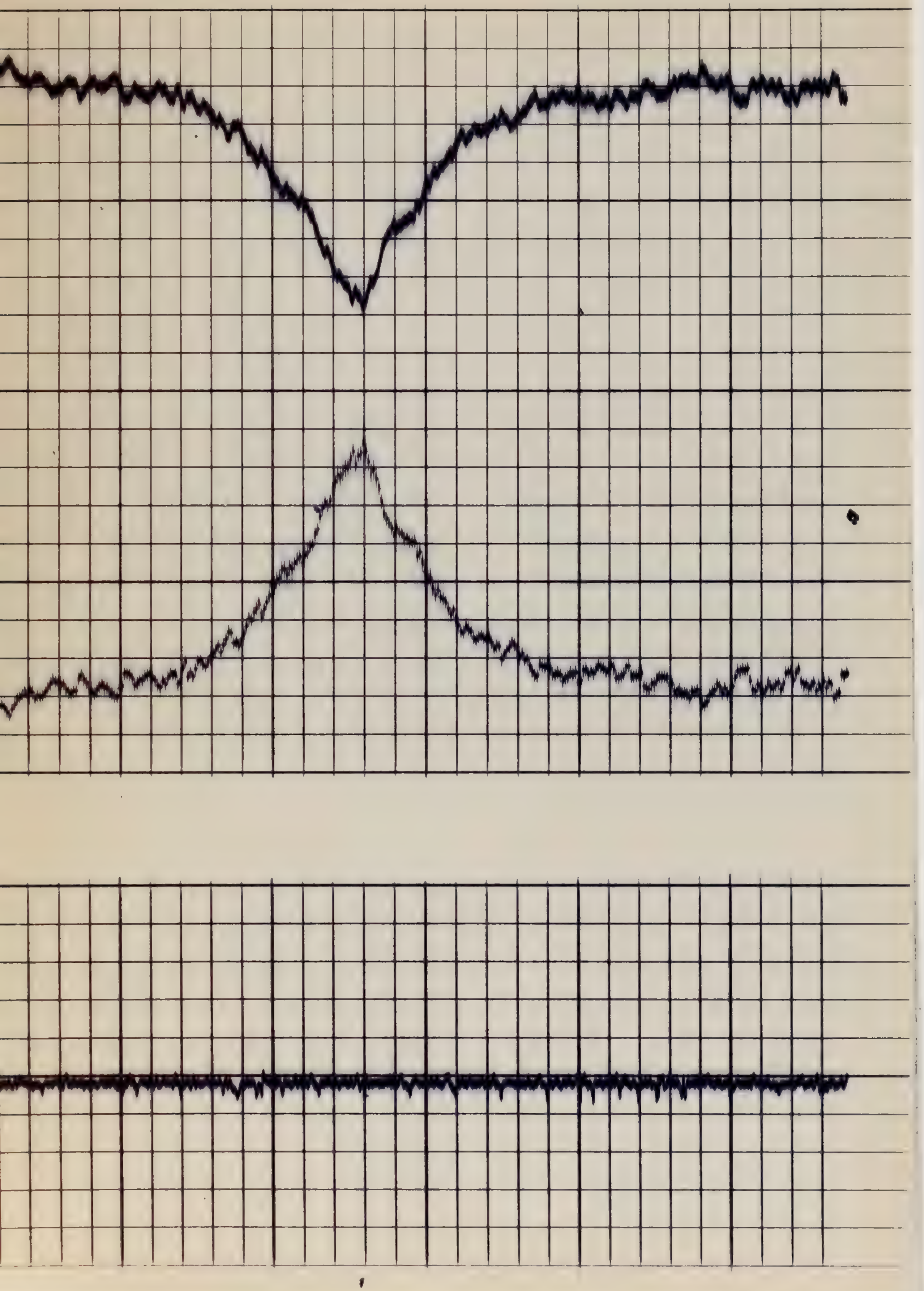


TYPICAL RECORD FOR
NO.1-LONG STRING
MADE FROM ORIENTATION
OF GUN NO.1

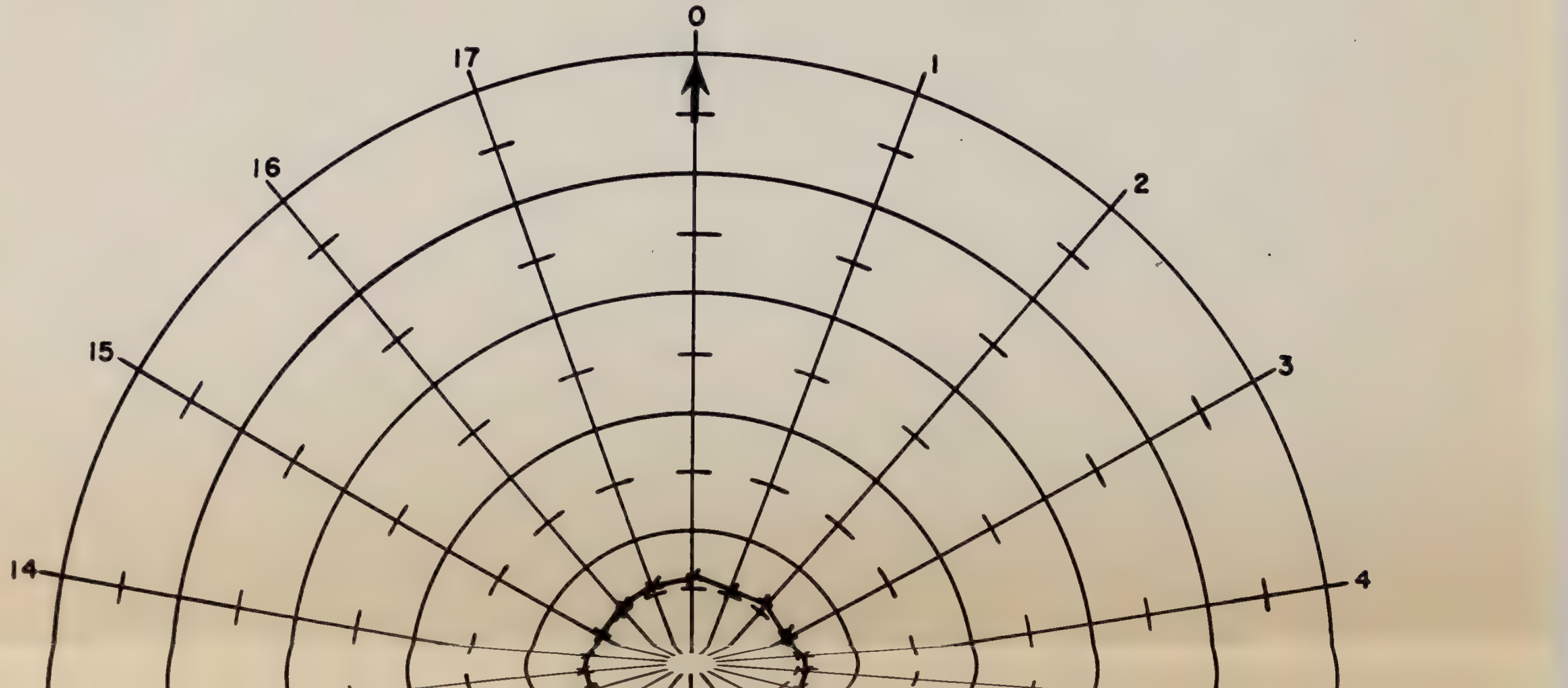


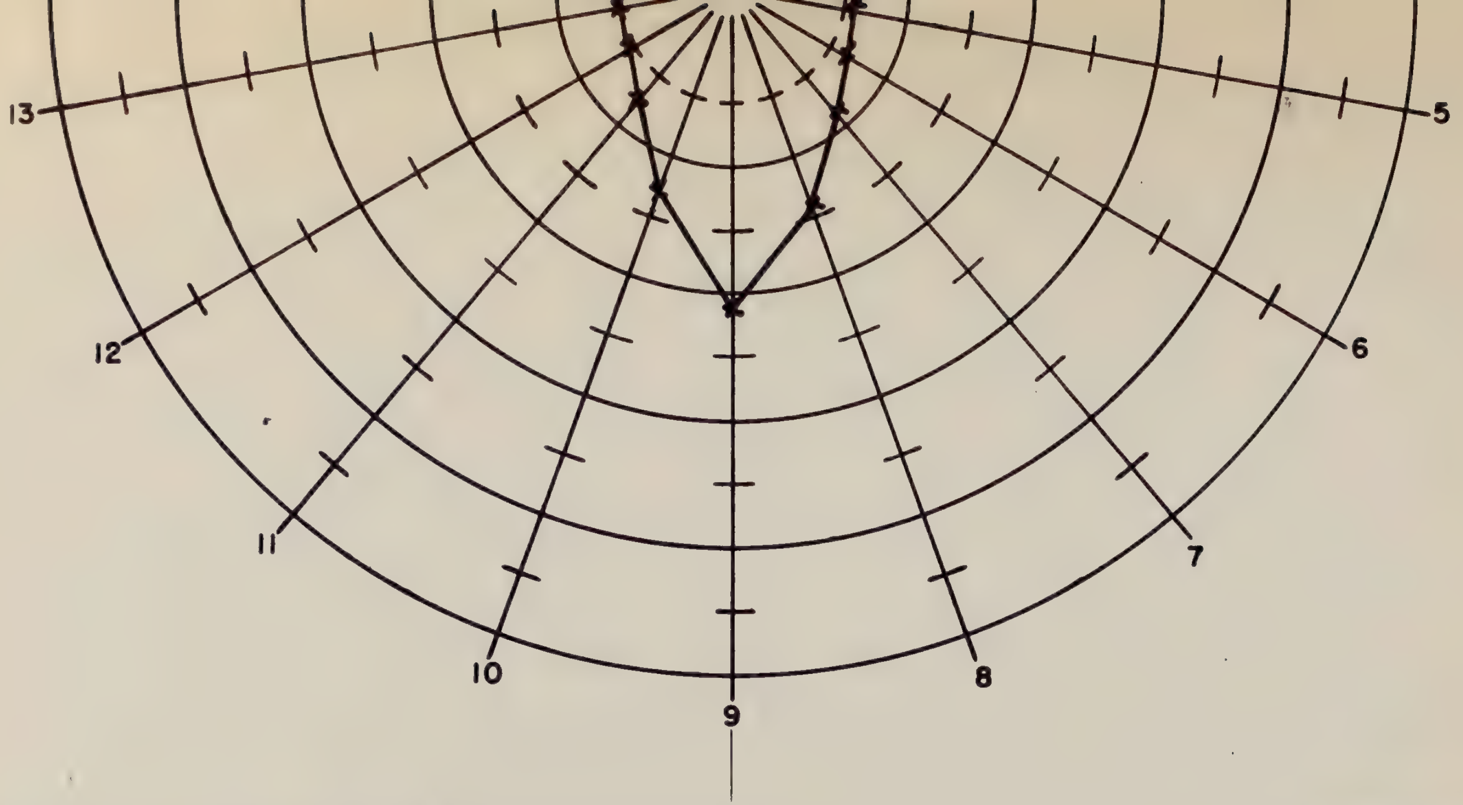


RADIORIENTATION PLOT

POT-B

NO.1-LONG STRING- 11 SHOTS GUN NO. 1- PERFORATIONS 1482-1492 1 SHOT PER FOOT.
SHOTS





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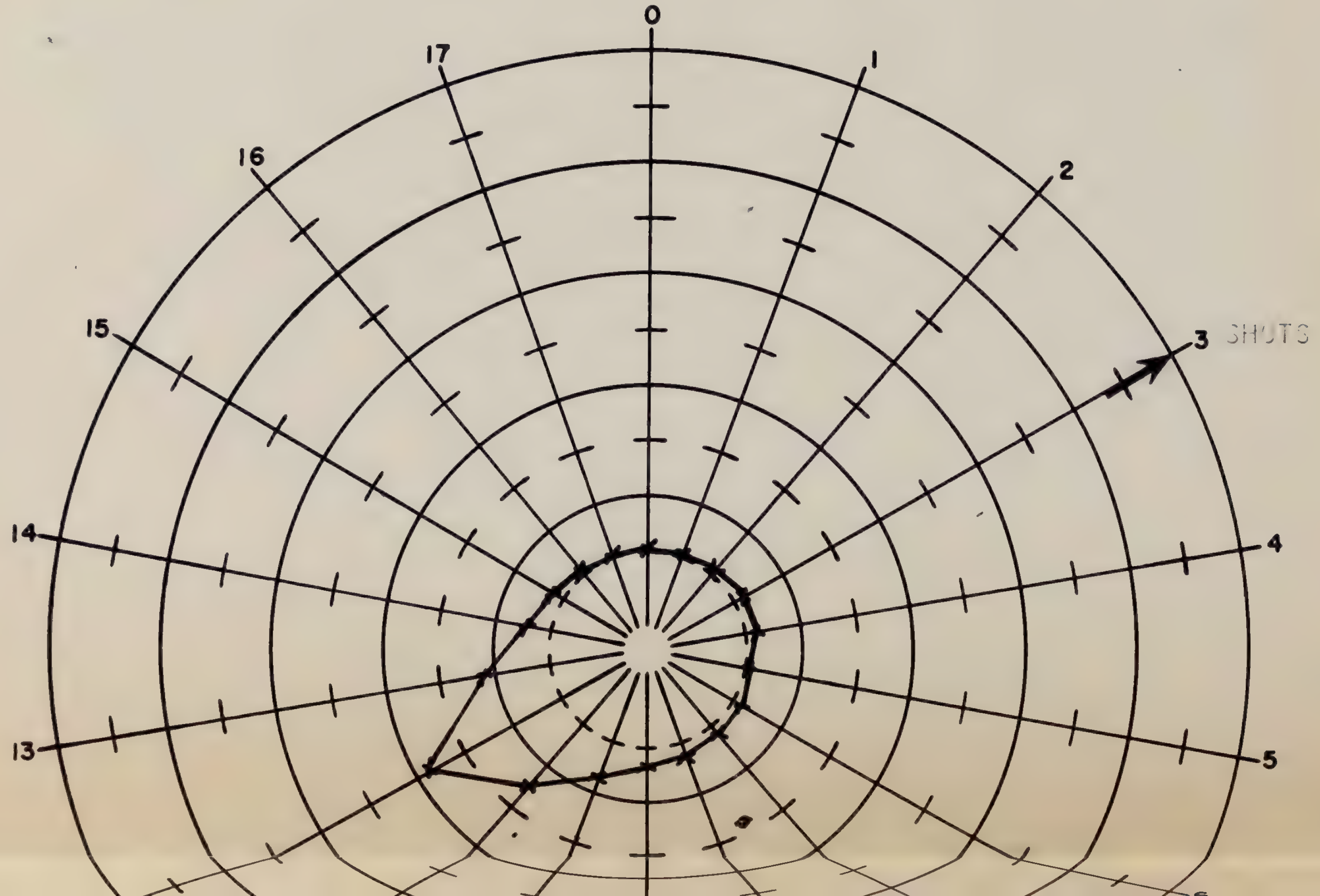
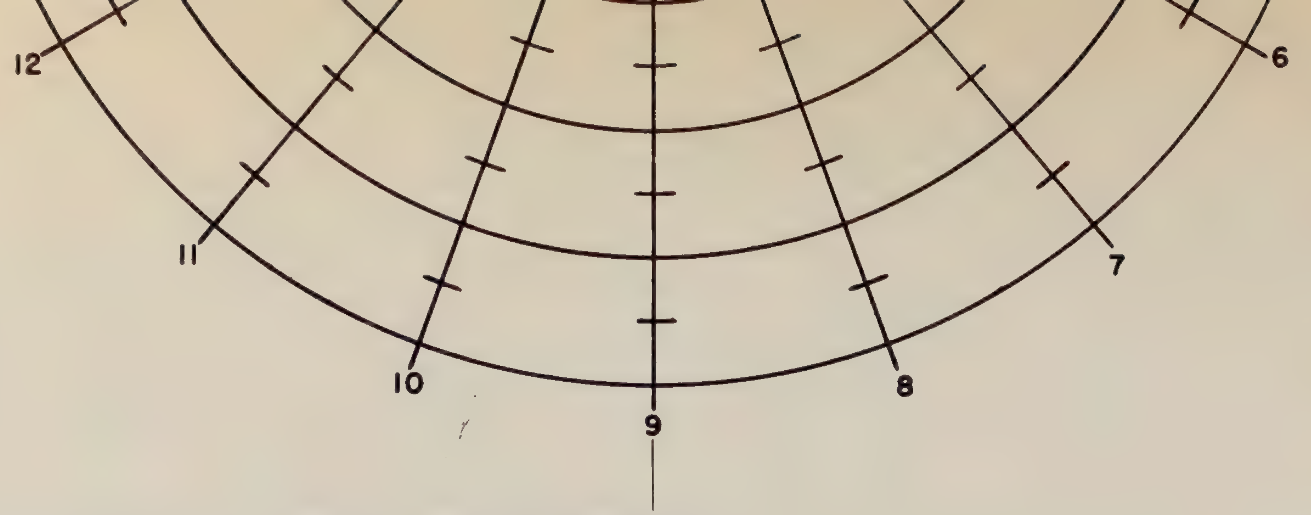
RADIORIENTATION PLOT

POT-B

NO. 1-LONG STRING- 11 SHOTS GUN NO. 2 PERFORATIONS 1471-1481 1 SHOT PER FOOT





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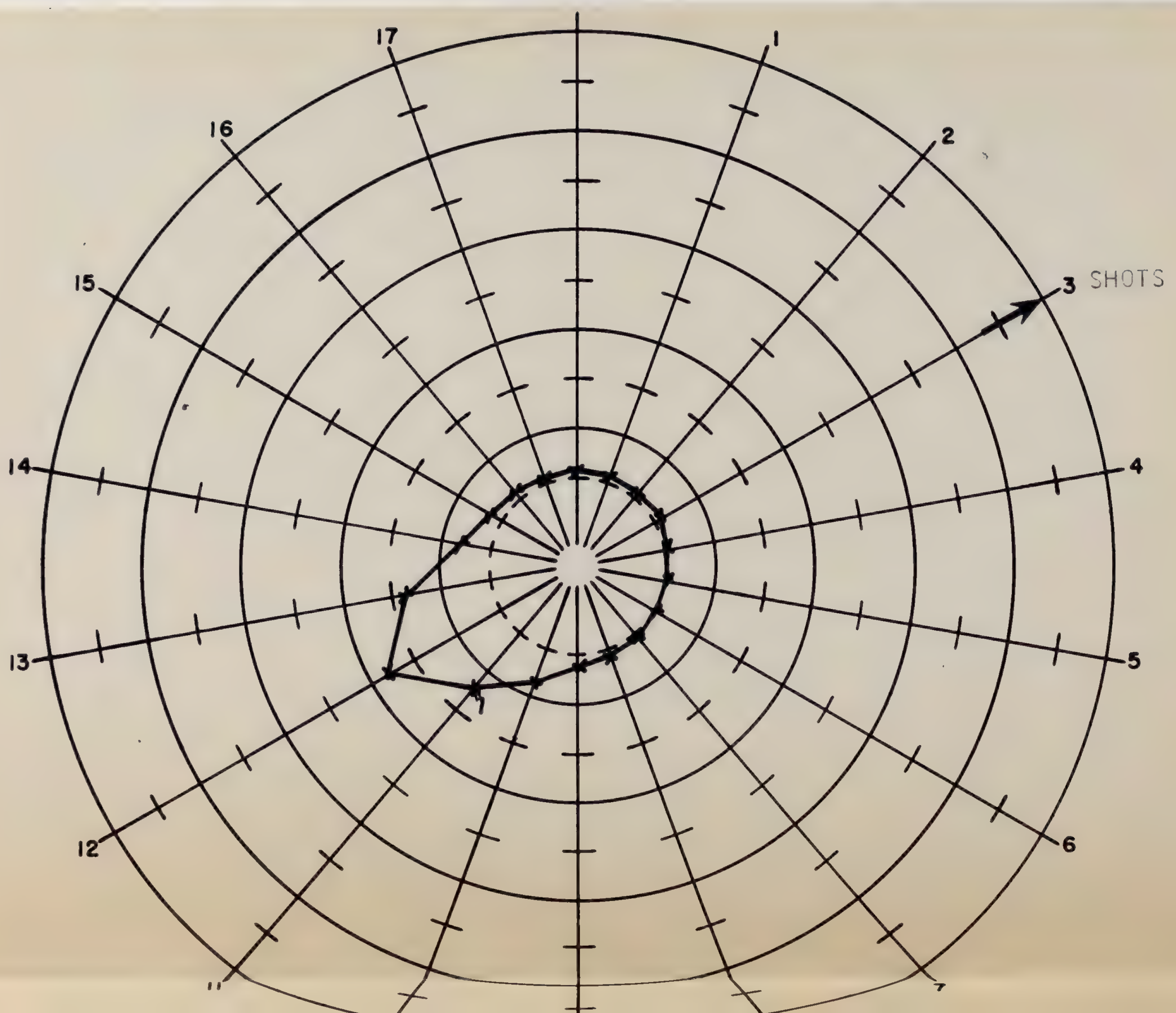
RADIORIENTATION PLOT

POT-B

NO.1-LONG STRING- 11 SHOTS GUN NO.3 PERFORATIONS 1460-1470 1 SHOT PER FOOT

0


17
1
16
2
15
3
SHOTS
14
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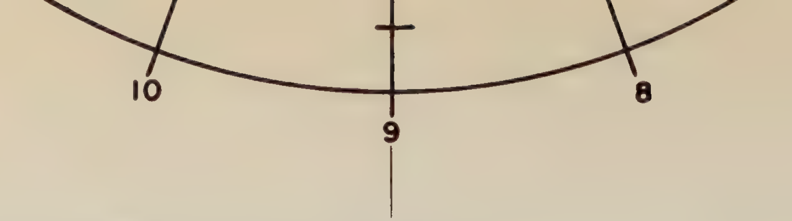

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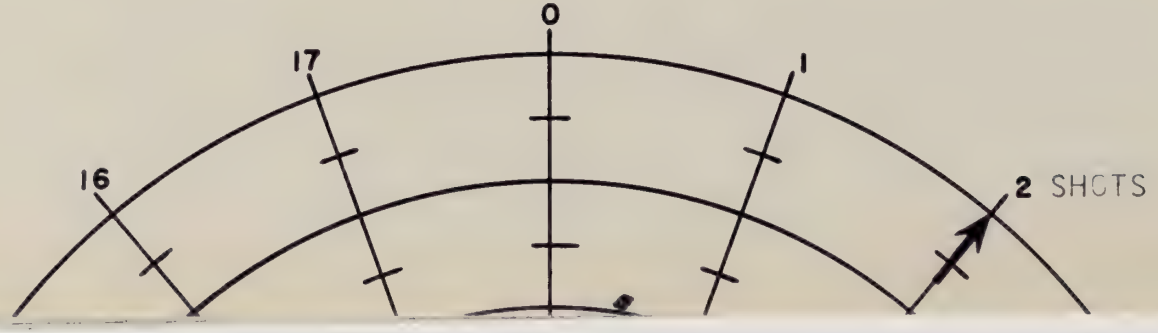
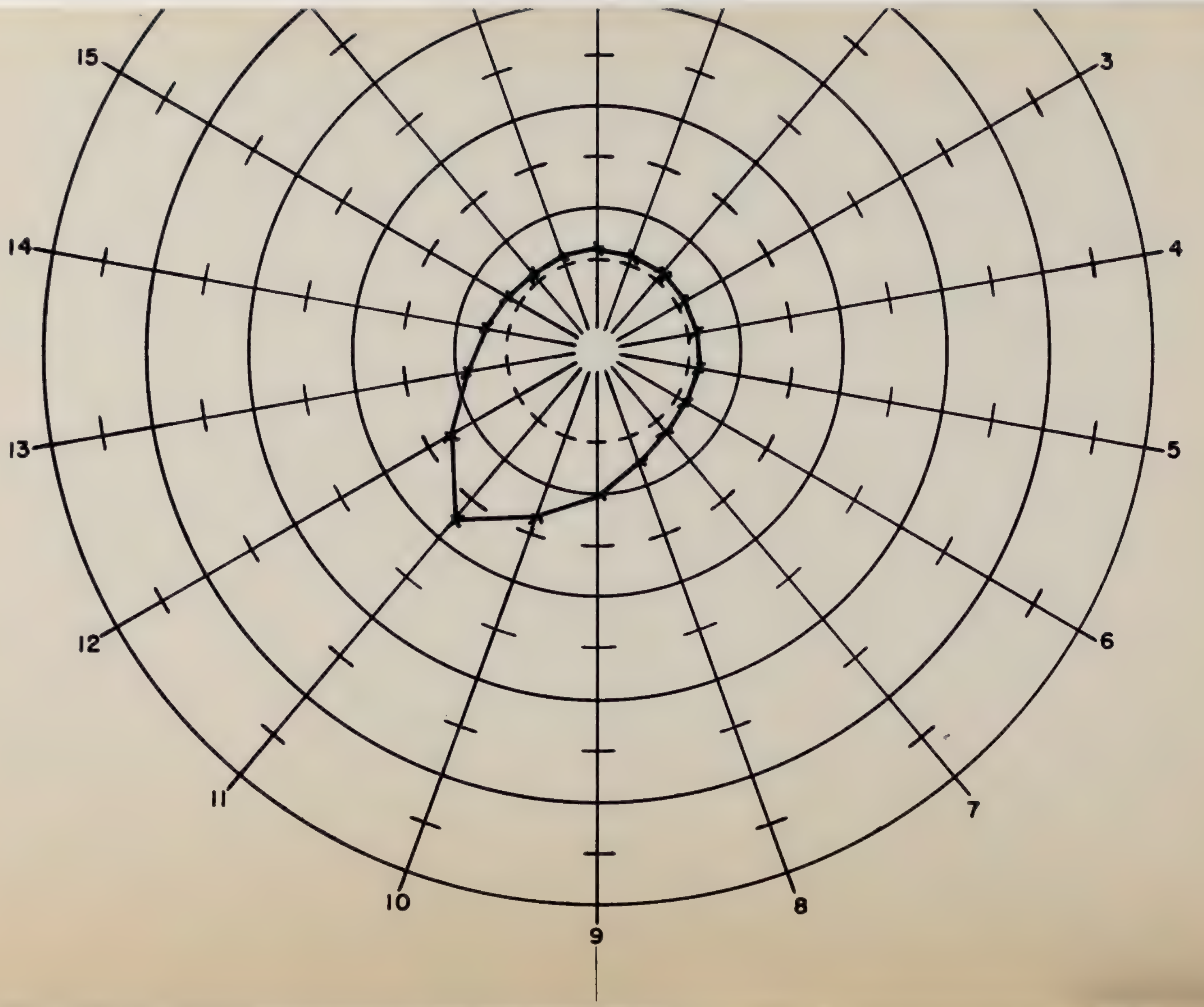
RADIORIENTATION PLOT

POT-B

NO.1-LONG STRING- 11 SHOTS GUN NO.4 PERFORATIONS 1449-1459 1 SHOT PER FOOT





This chart, computation and/or interpretation of our readings from our gamma gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse … The readings could be adversely affected by vagrant metal in the

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as are set out on pages 1 and 2 of our
side of our Service Order for this job. The readings could be adversely affected by vagrant metal in the drill hole and other conditions unknown to us.

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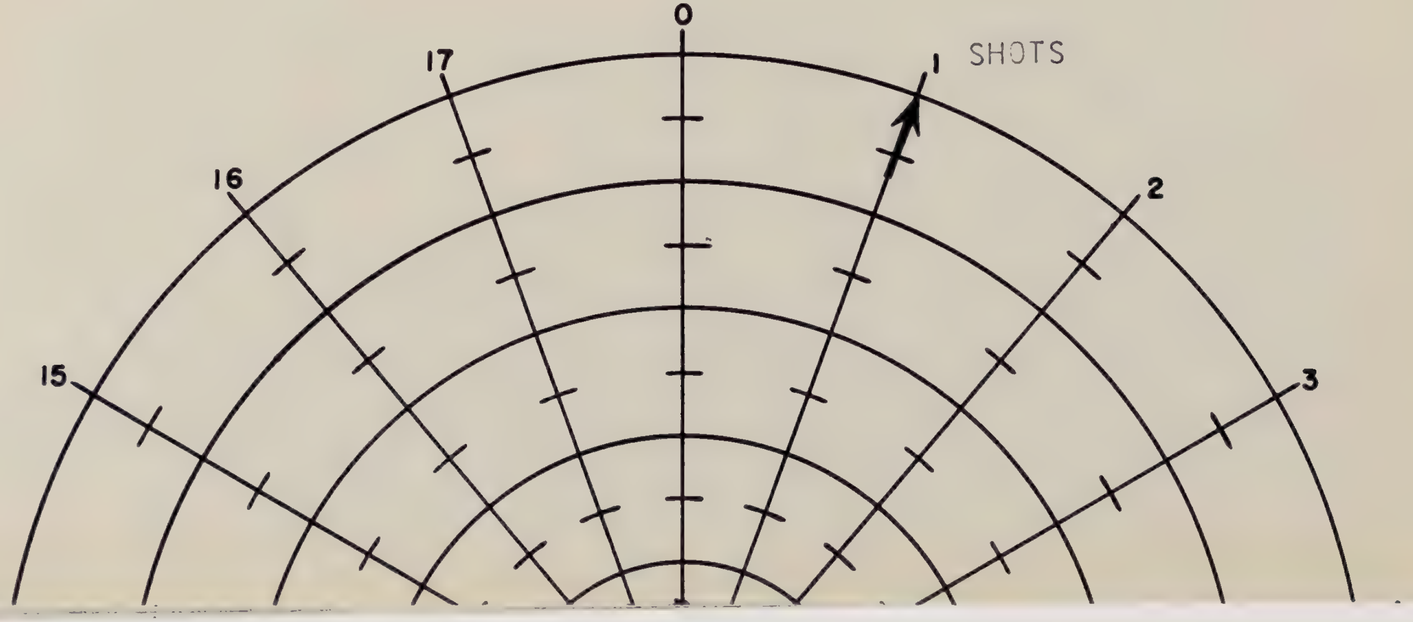
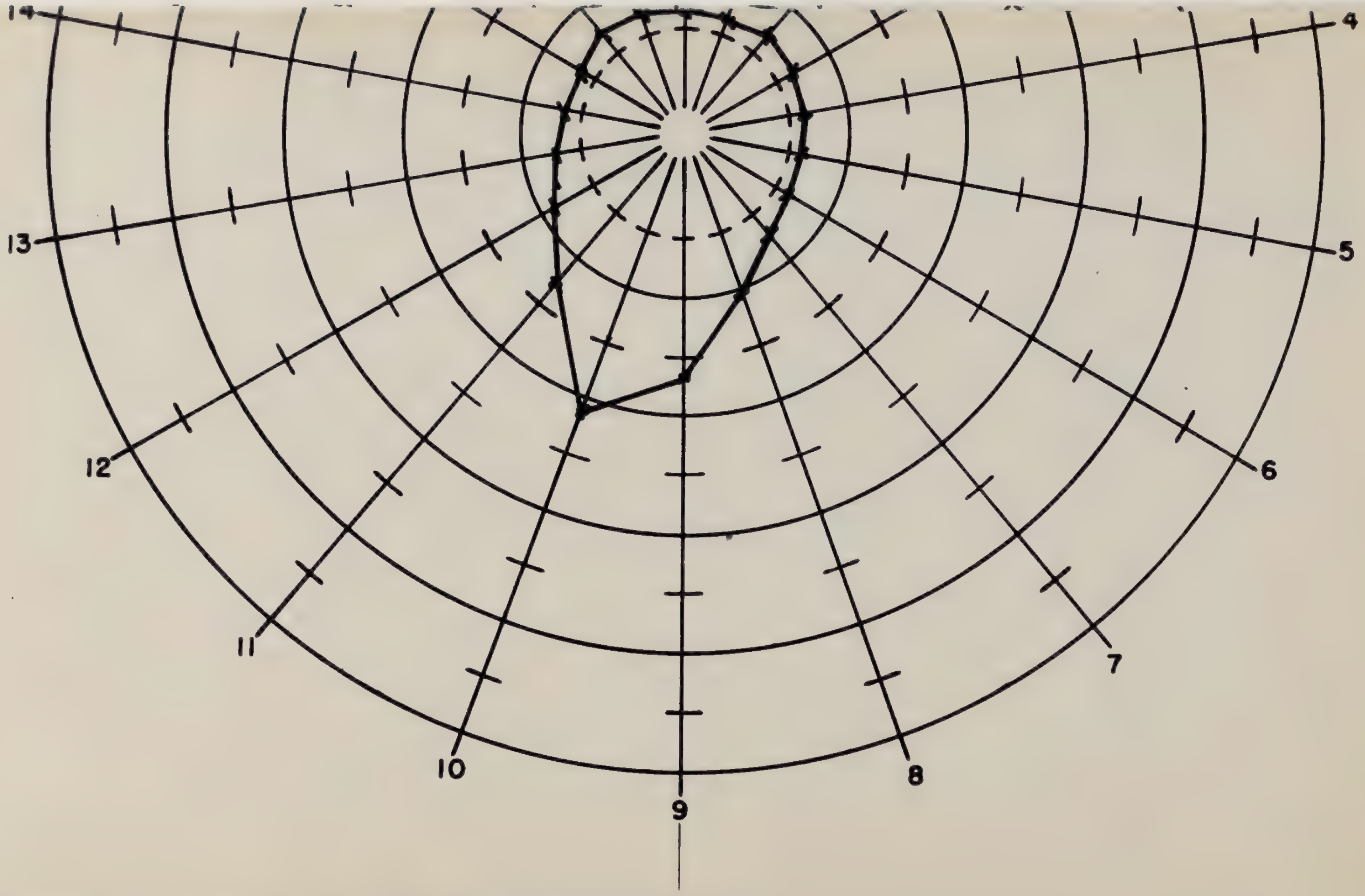
RADIORIENTATION PLOT

POT-B

NO.1-LONG STRING- 11 SHOTS GUN NO.5 ERFORATIONS 1438-1448 ONE SHOT PER FOOT





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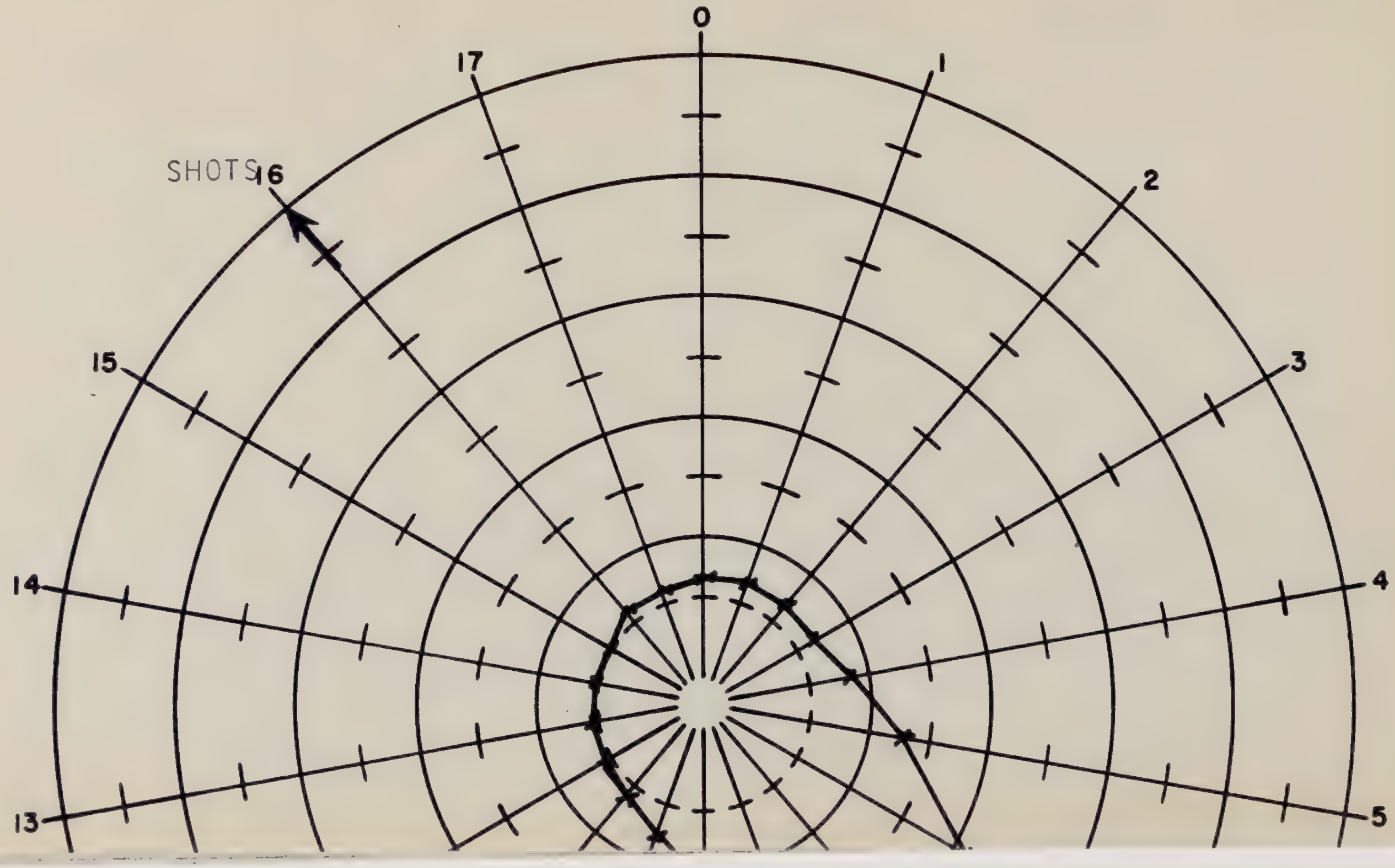
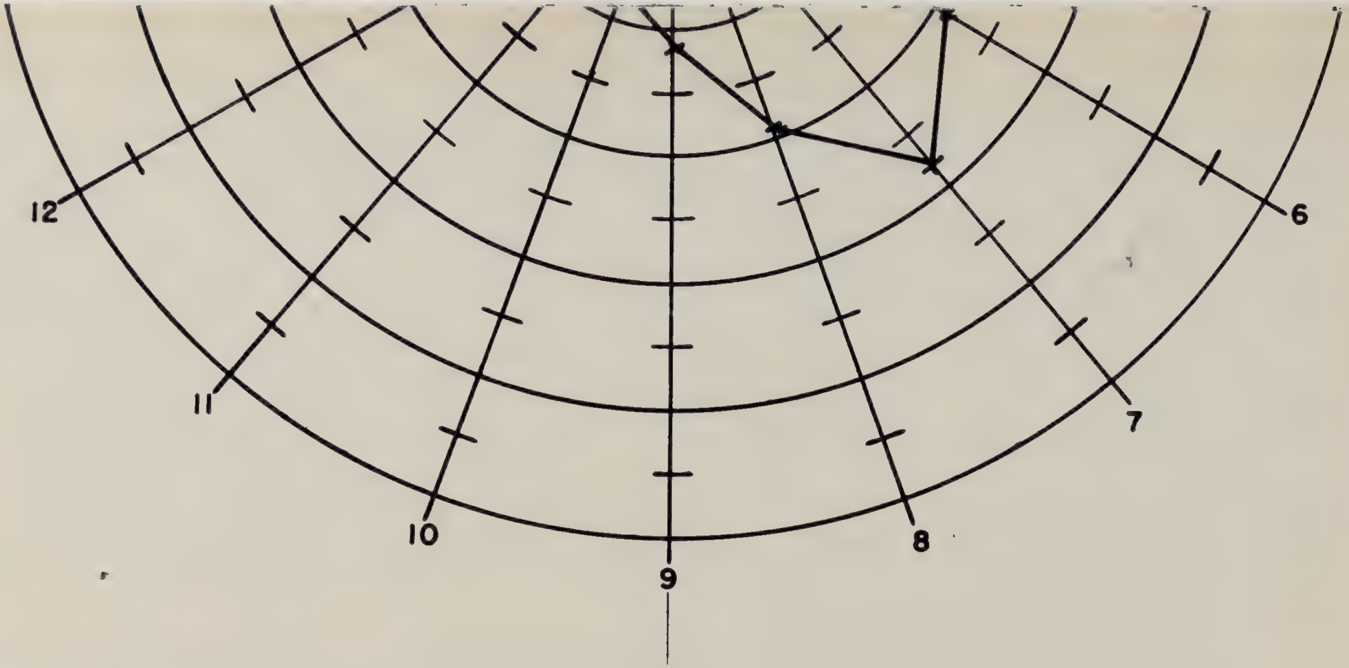
RADIORIENTATION PLOT

POT-B

NO.1-LONG STRING- 11 SHOTS GUN NO. 6 PERFORATIONS 1427-1437 ONE SHOT PER FOOT





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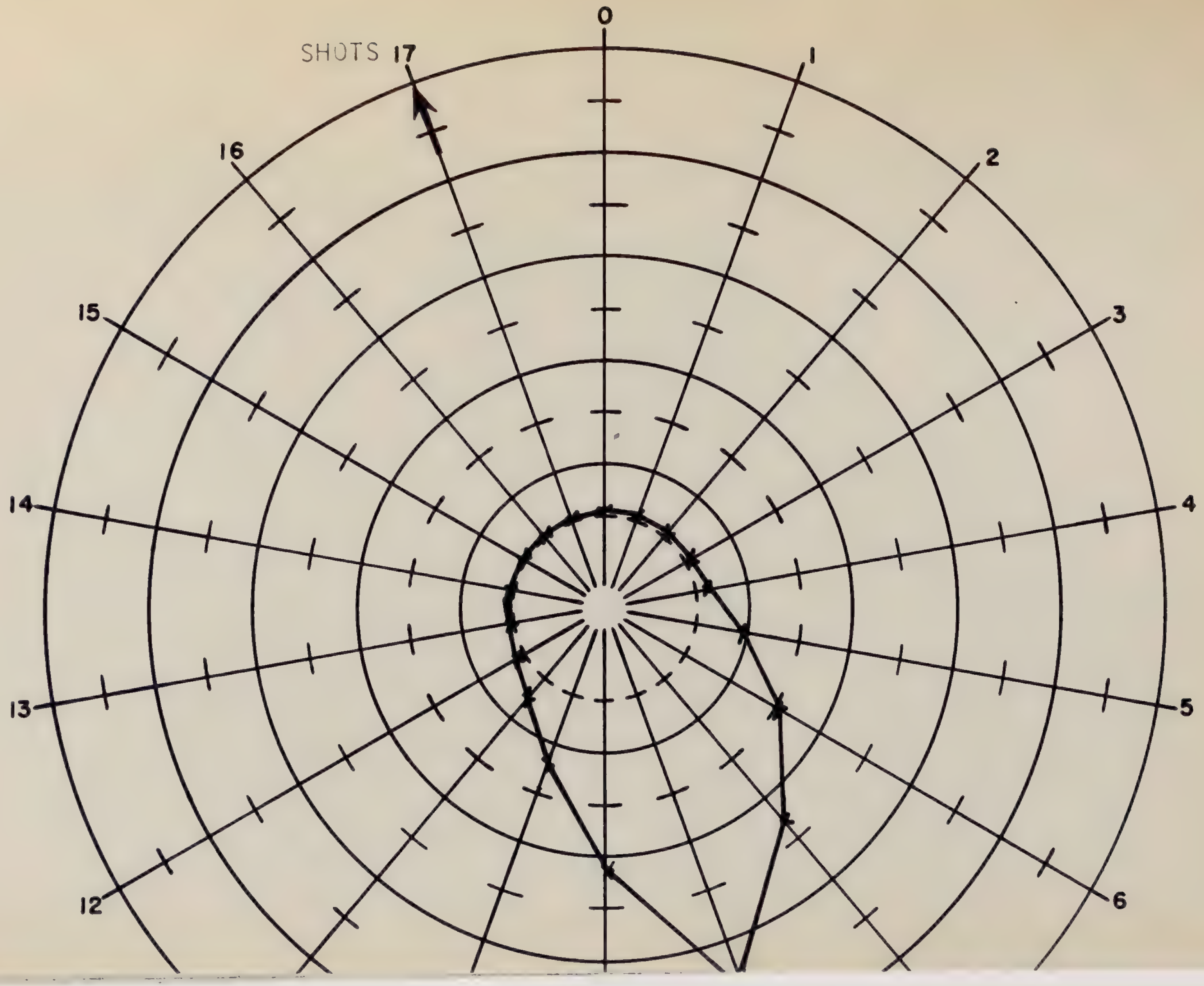
RADIORIENTATION PLOT

POT-B

NO.1-LONG STRING- 11 SHOTS GUN NO.7 PERFORATIONS 1416-1426 ONE SHOT PER FOOT


SHOTS
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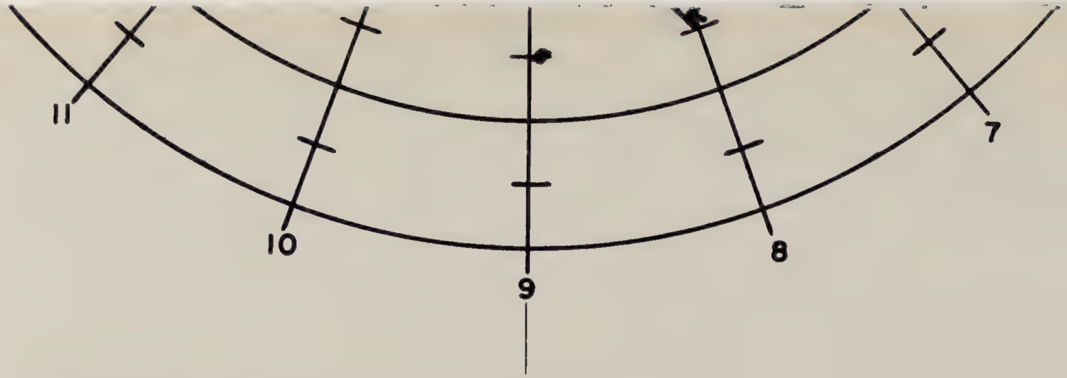

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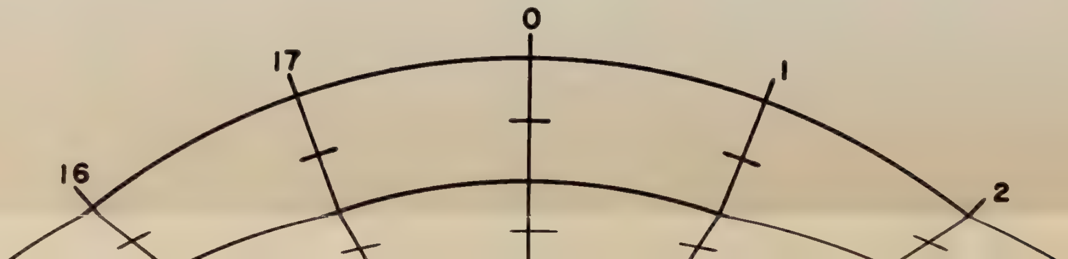
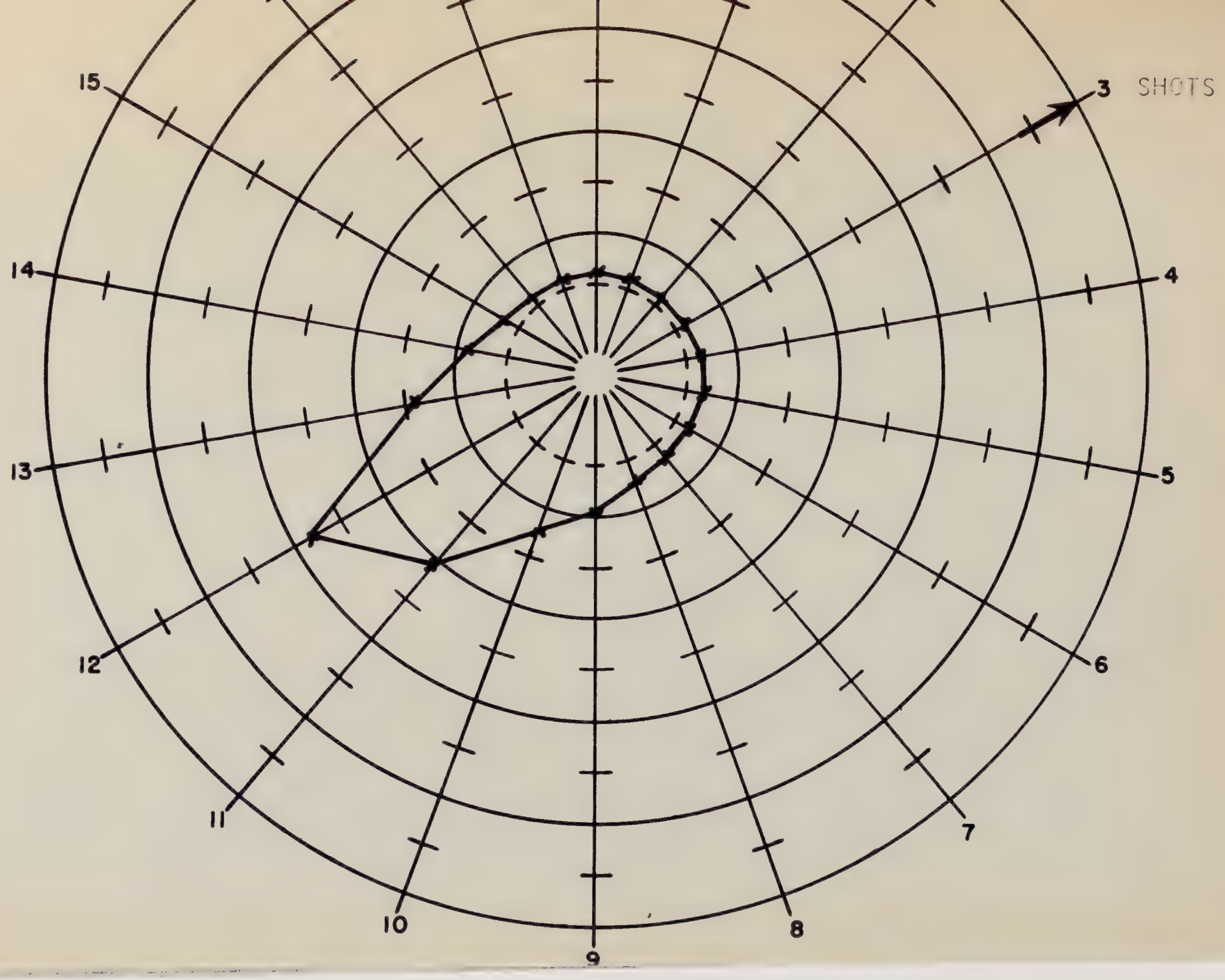
RADIORIENTATION PLOT

POT-B

NO. 1-LONG STRING- 11 SHOTS GUN NO.8 PERFORATIONS 1405-1415 ONE SHOT PER FOOT




SHOTS
3
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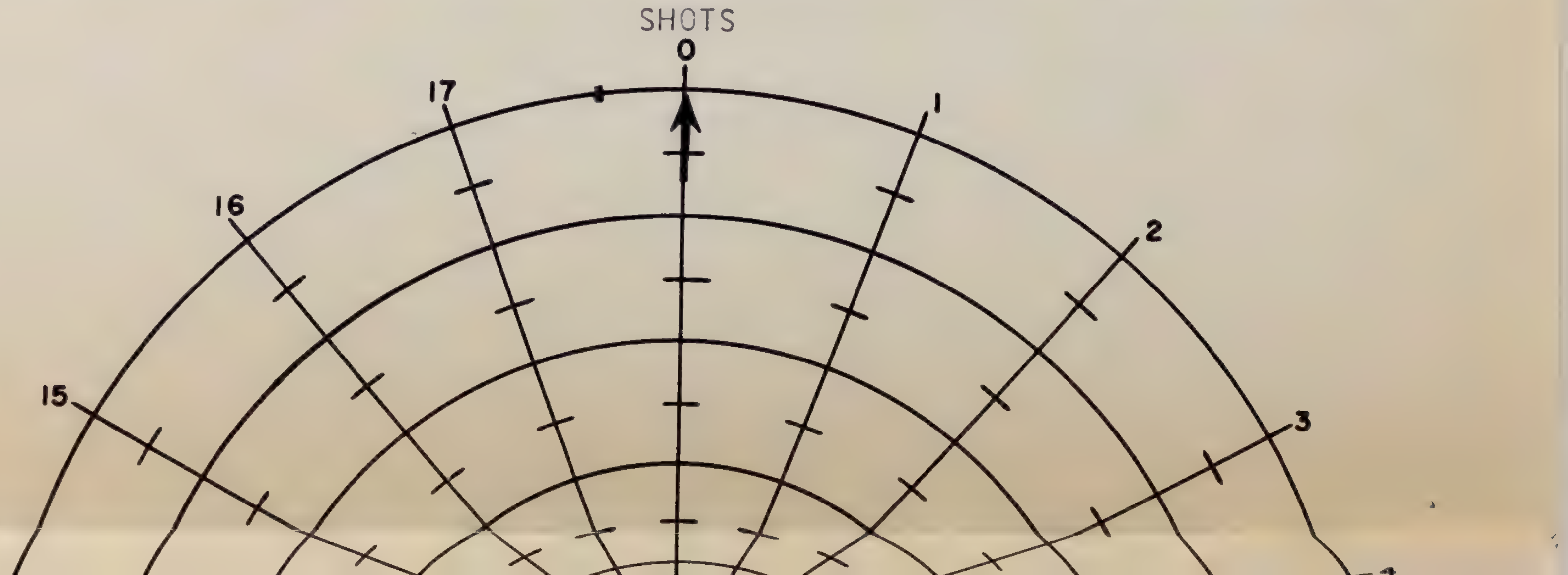
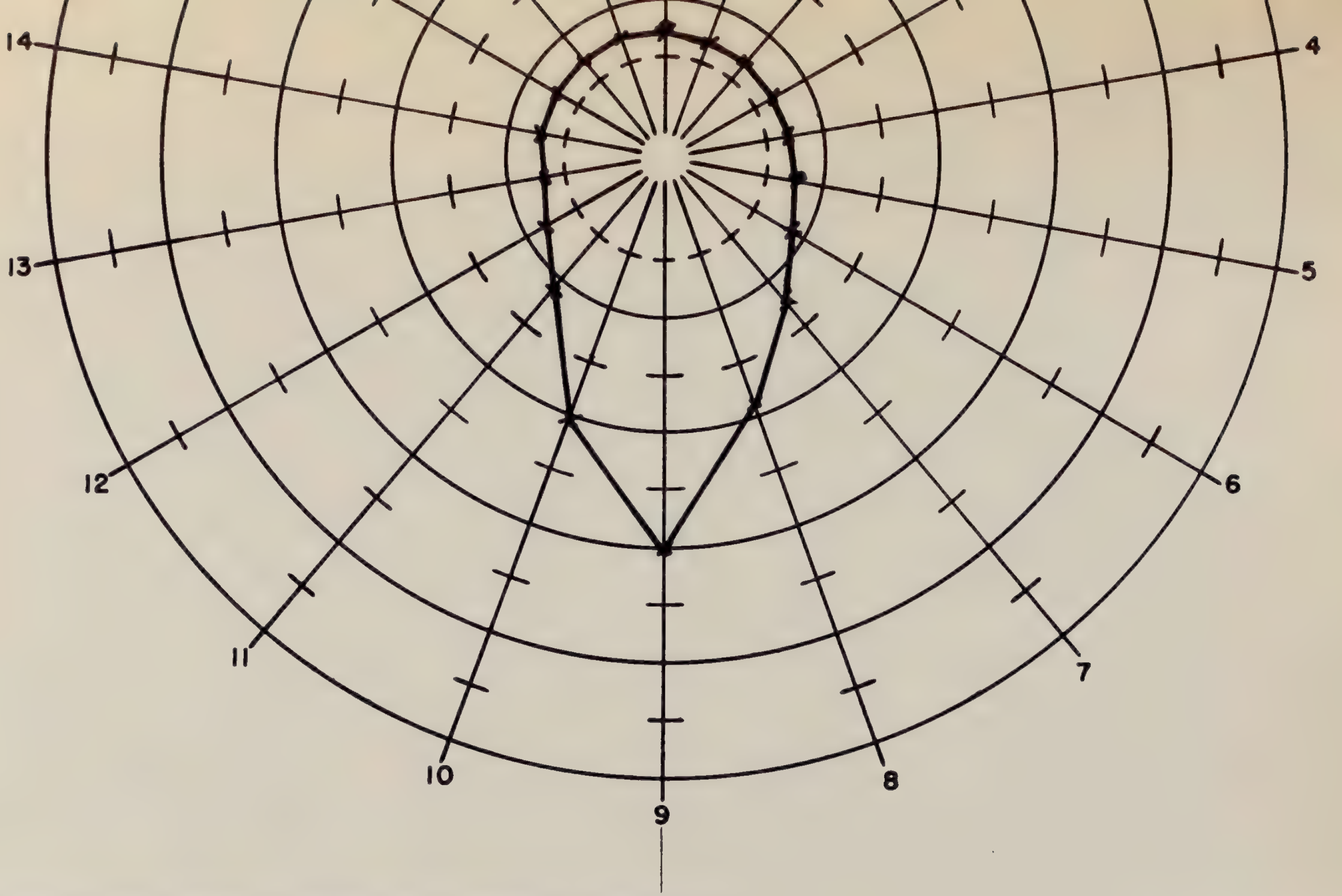
RADIORIENTATION PLOT

POT-B

NO. 1-LONG STRING- 11 SHOTS GUN NO. 9 PERFORATIONS 1394-1404 ONE SHOT PER FOOT





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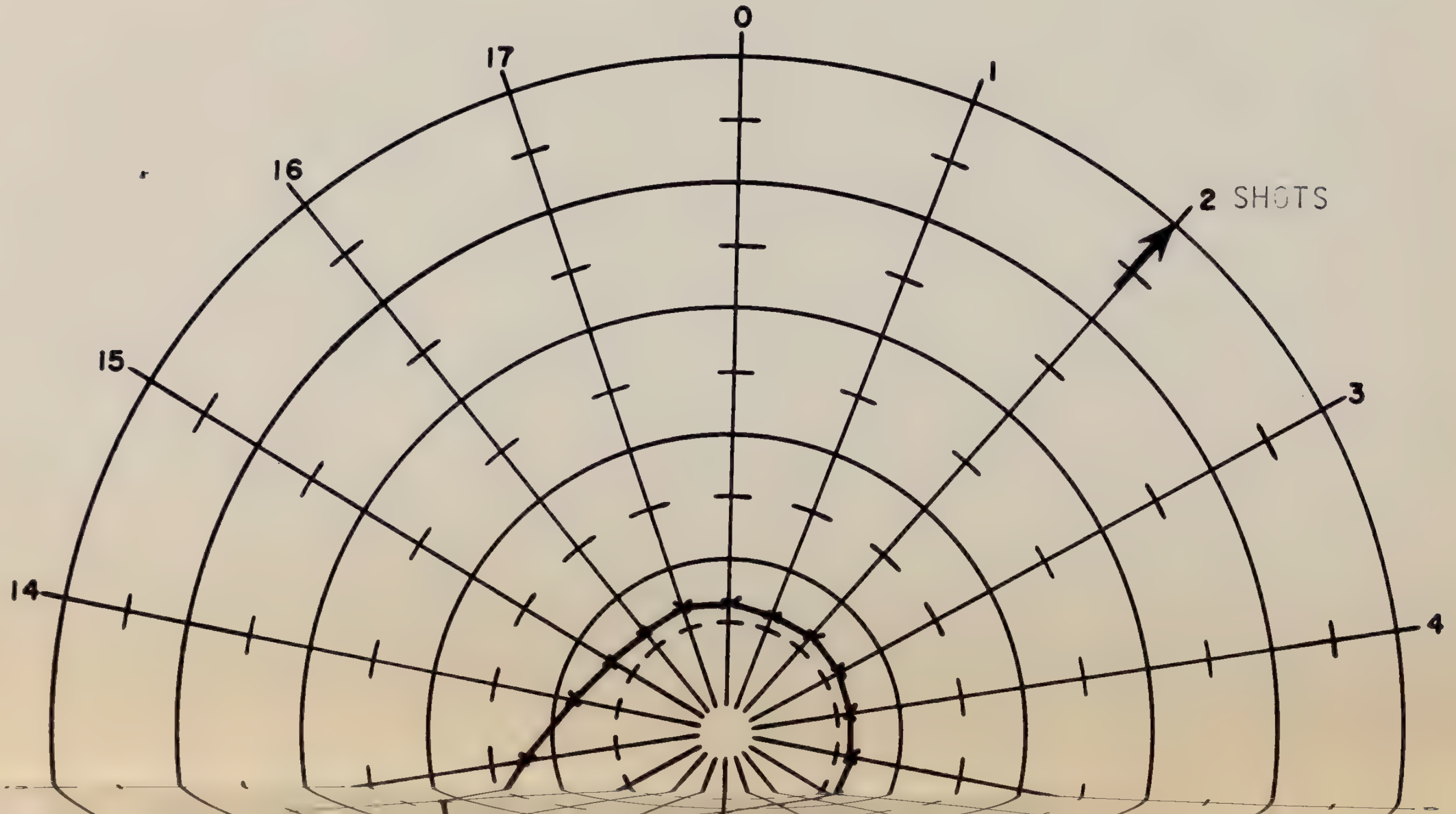
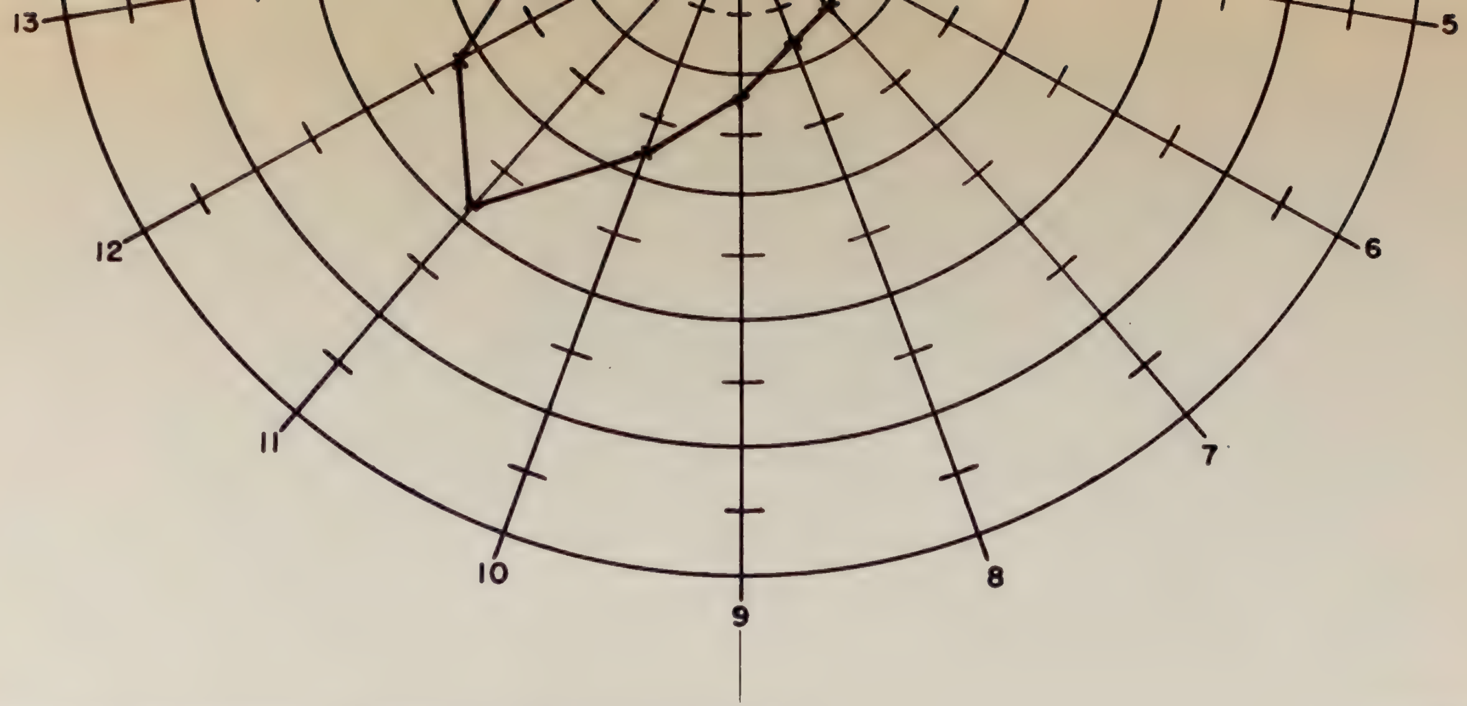
RADIORIENTATION PLOT

POT-B

NO. 1-LONG STRING- 11 SHOTS GUN NO.10 PERFORATIONS 1383-1393 ONE SHOT PER FOOT





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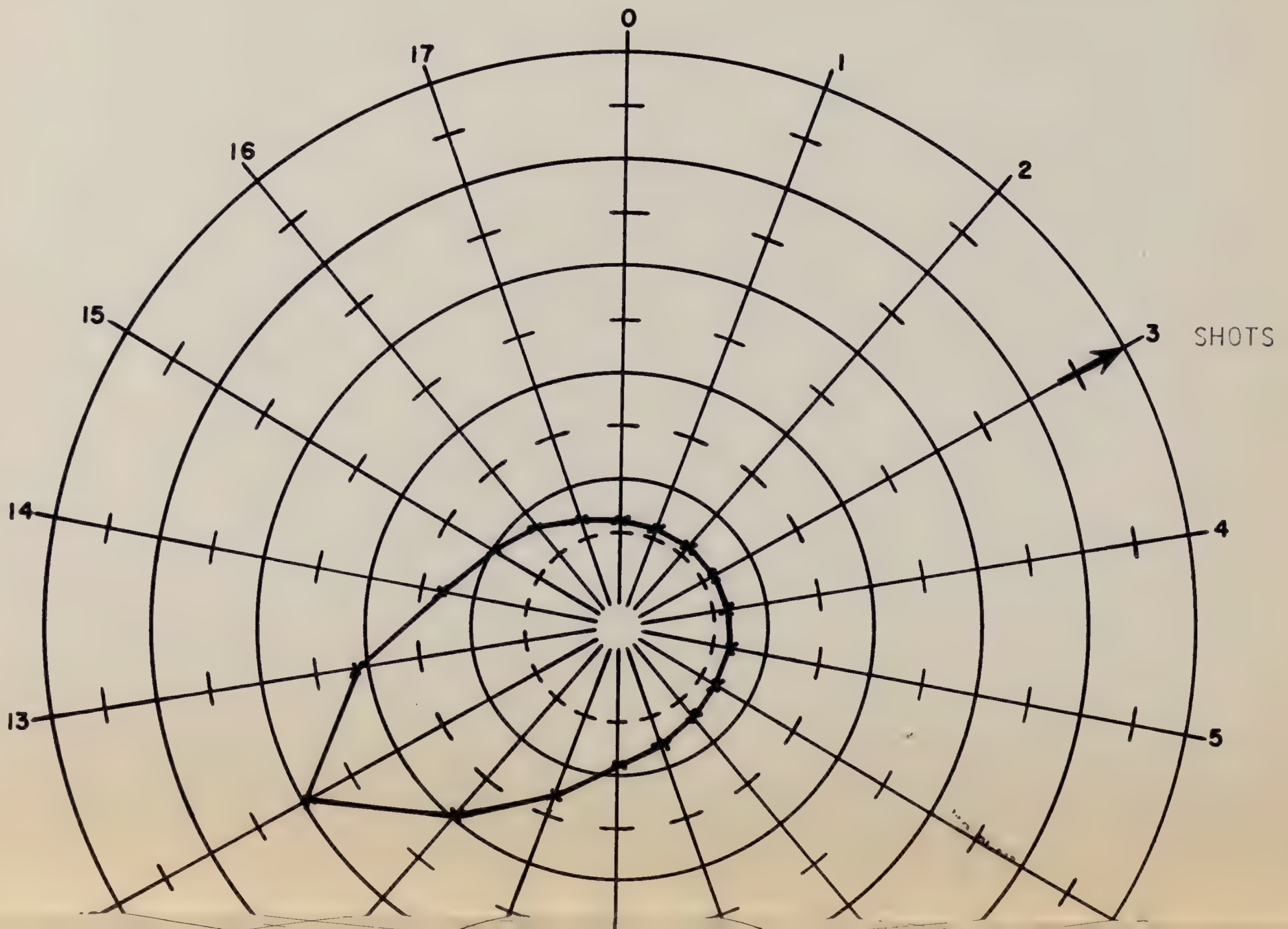
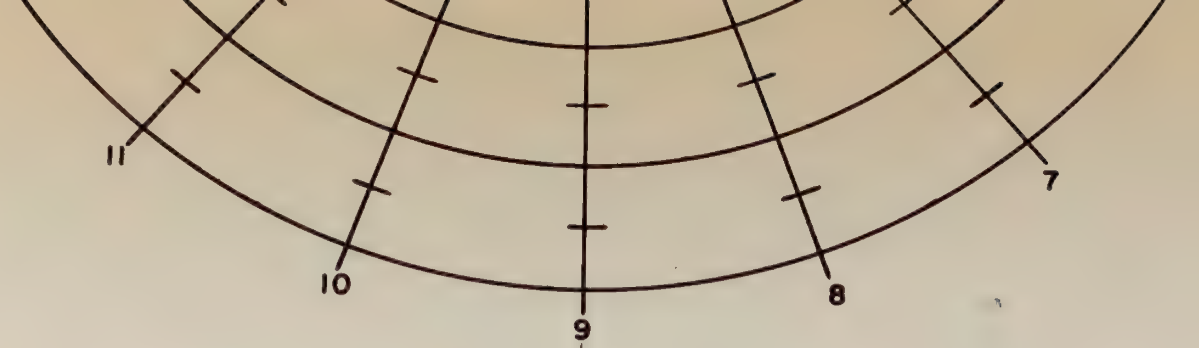
RADIORIENTATION PLOT

RADIORIENTATION PLOT

POT-B

NO.1-LONG STRING-11 SHOTS GUN NO. 11 PERFORATIONS 1372-1382 ONE SHOT PER FOOT





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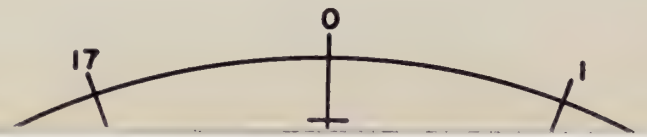
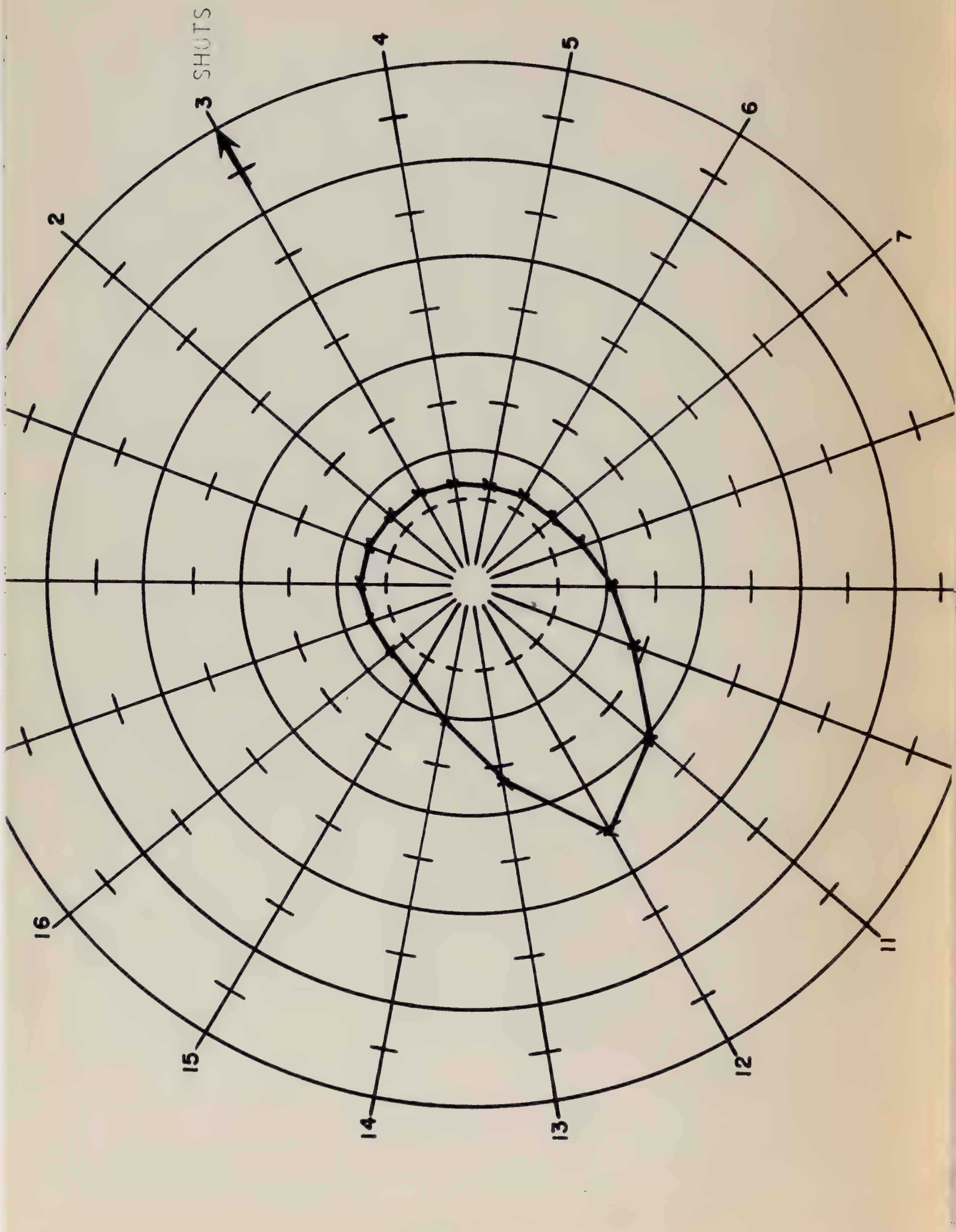
RADIORIENTATION PLOT

POT-B

NO.1-LONG STRING-11 SHOTS GUN NO. 12 PERFORATIONS 1361-1371 ONE SHOT PER FOOT




3 SHOTS
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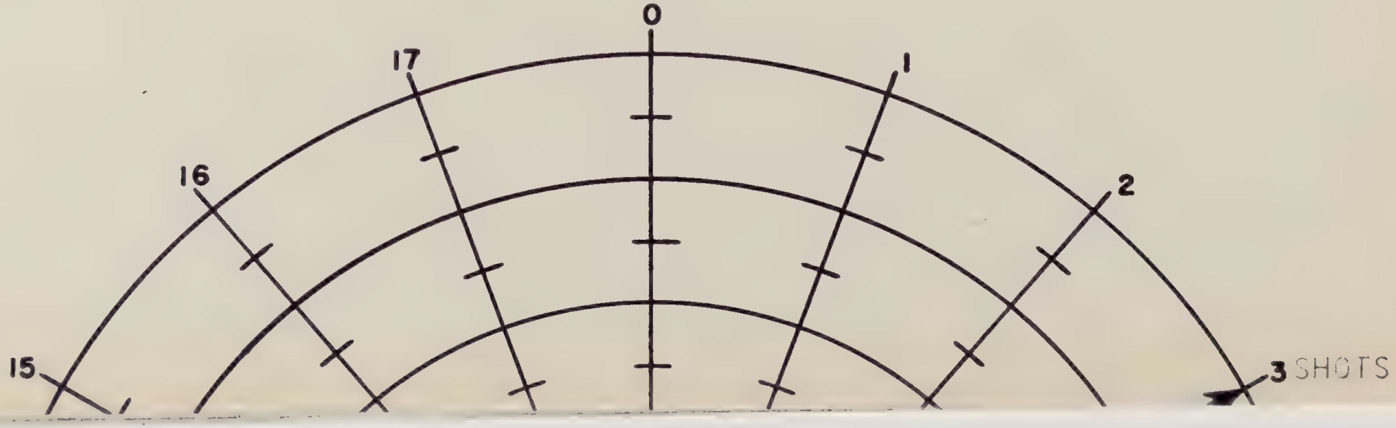
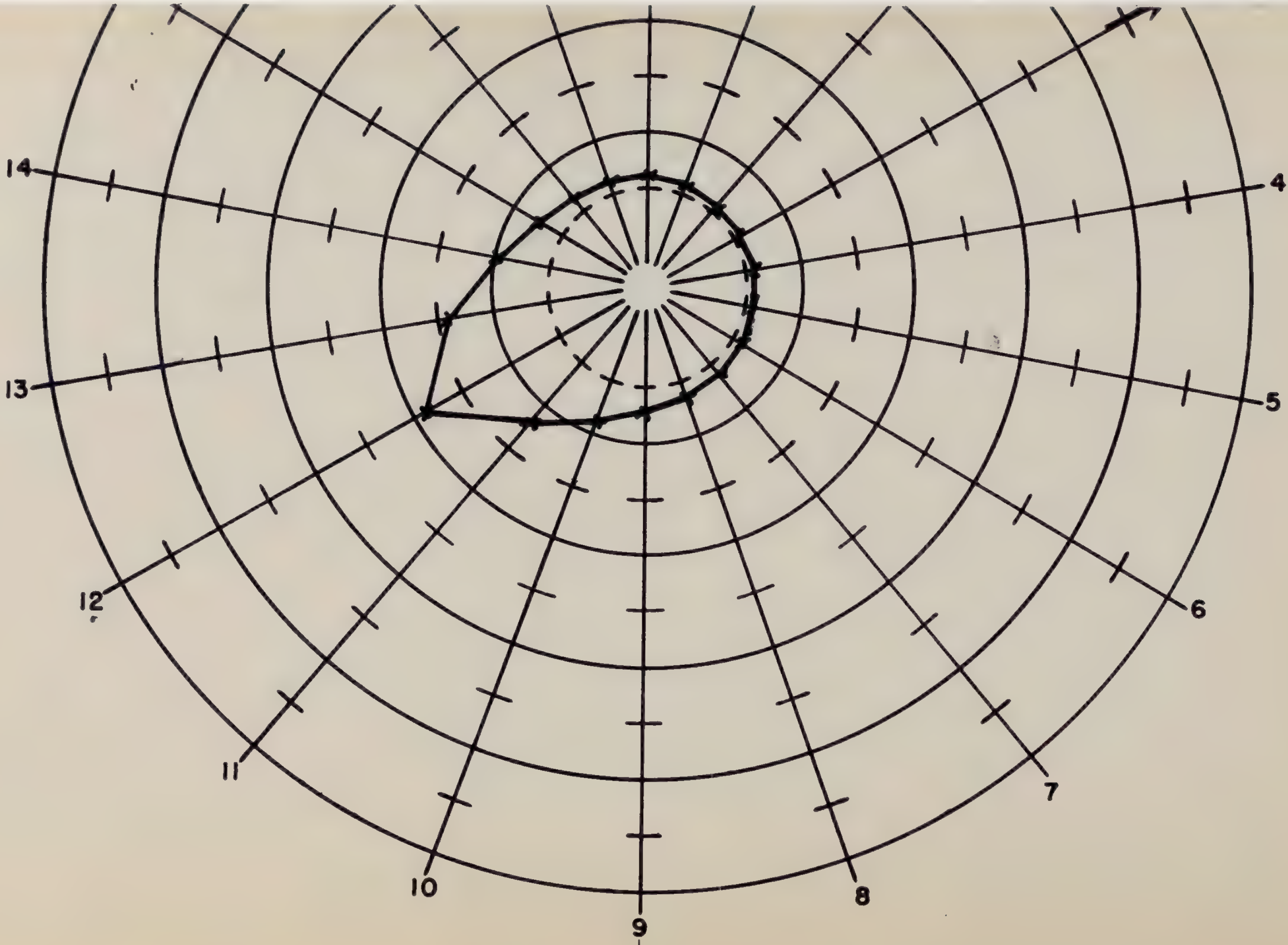
RADIORIENTATION PLOT

POT-B

NO. 1-LONG STRING-11 SHOTS GUN NO. 13 PERFORATIONS 1350-1360 ONE SHOT PER FOOT





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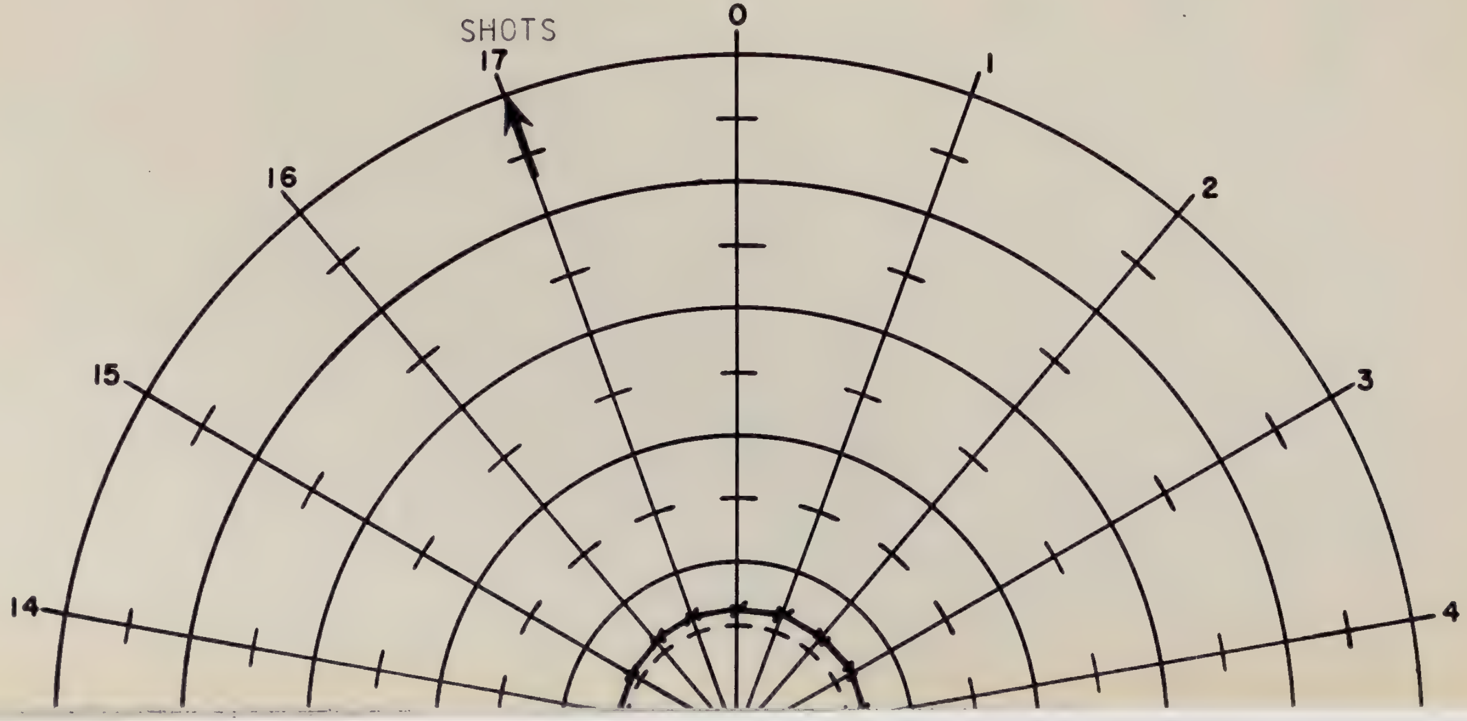
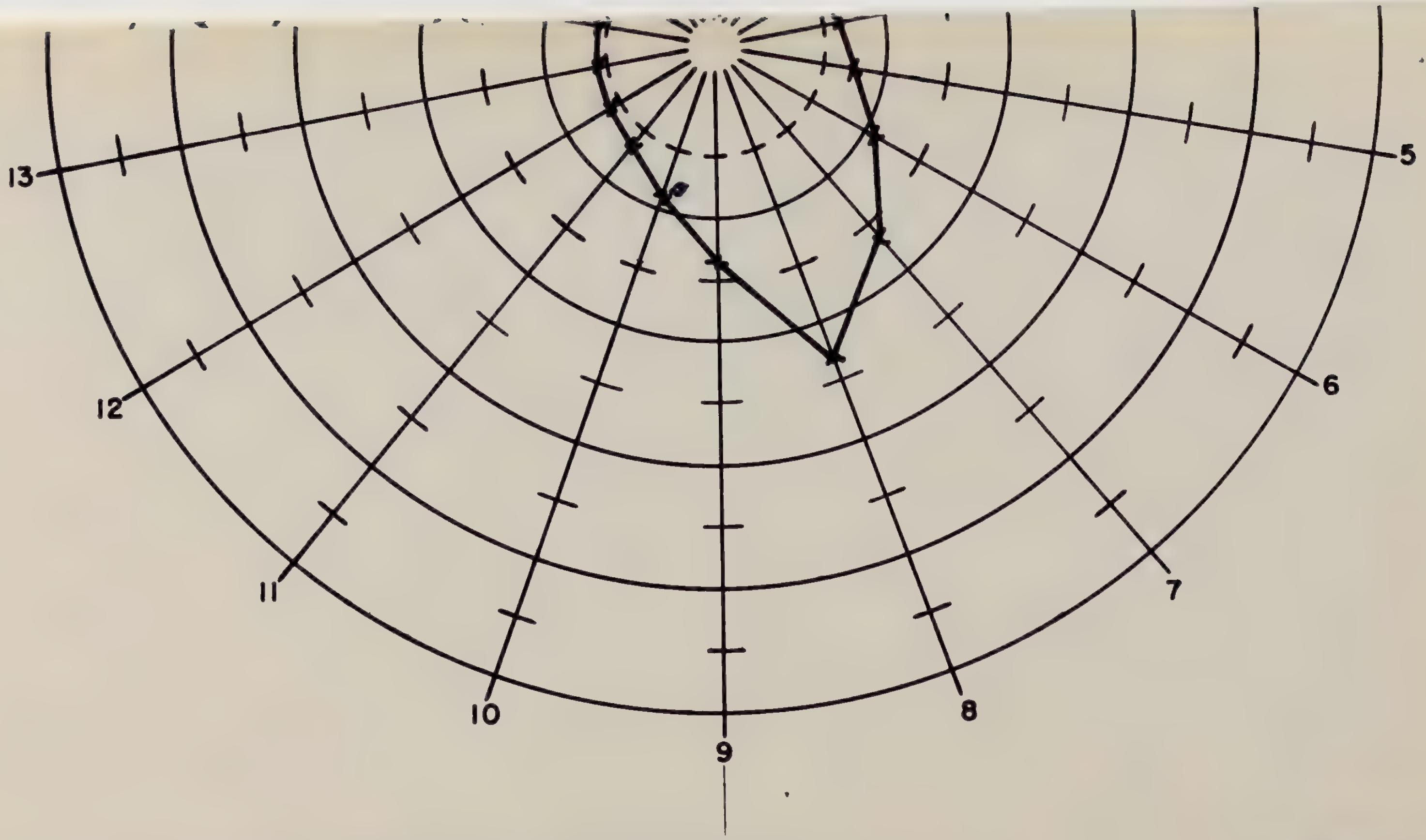
RADIORIENTATION PLOT

POT-B

NO.1-LONG STRING-11 SHOTS GUN NO. 14 PERFORATIONS 1339-1349 ONE SHOT PER FOOT





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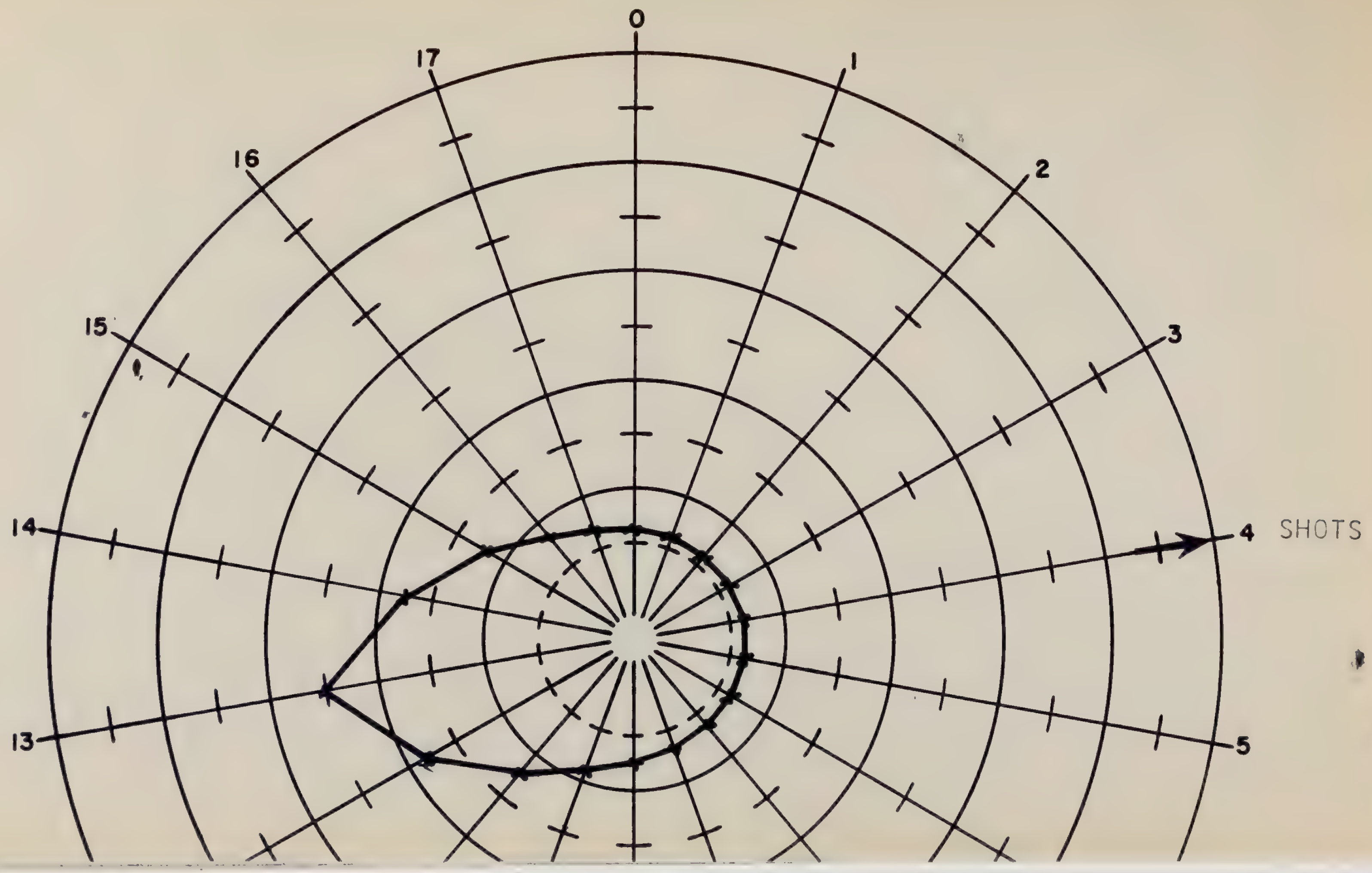
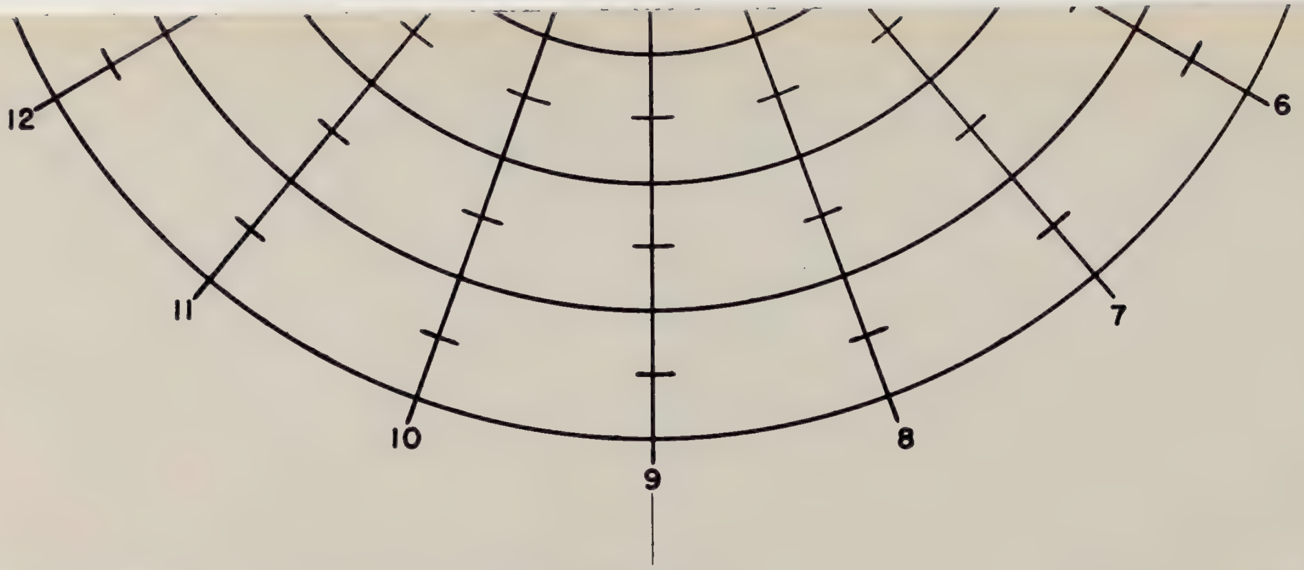
RADIORIENTATION PLOT

POT-B

NO.1-LONG STRING-11 SHOTS GUN NO. 15 PERFORATIONS 1328-1338 ONE SHOT PER FOOT





This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by vagrant metal in the drill hole and other conditions unknown to us.

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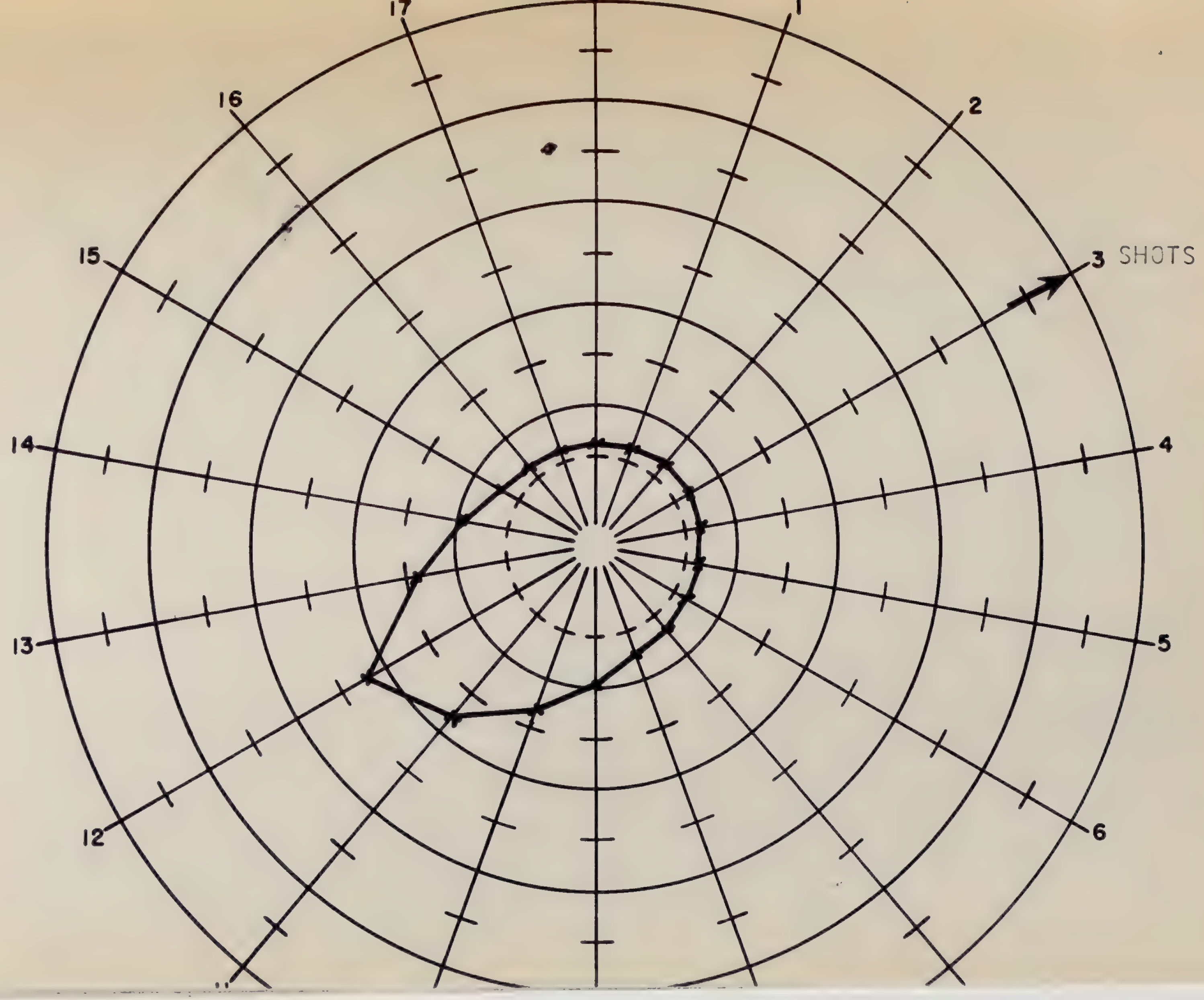
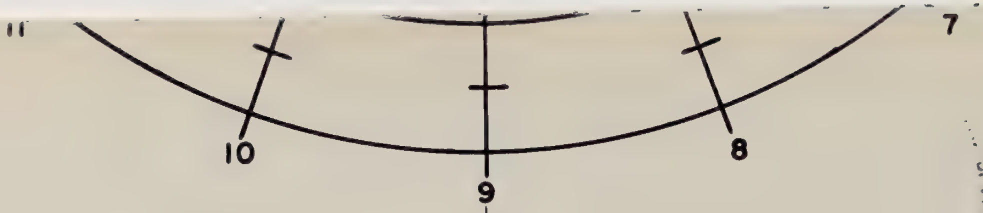
RADIORIENTATION PLOT

POT-B

NO.1-LONG STRING-11 SHOTS GUN NO.16 PERFORATIONS 1317-1327 ONE SHOT PER FOOT

0


17
1
16
2
15
3 SHOTS
14
4
13
5
12
6
11



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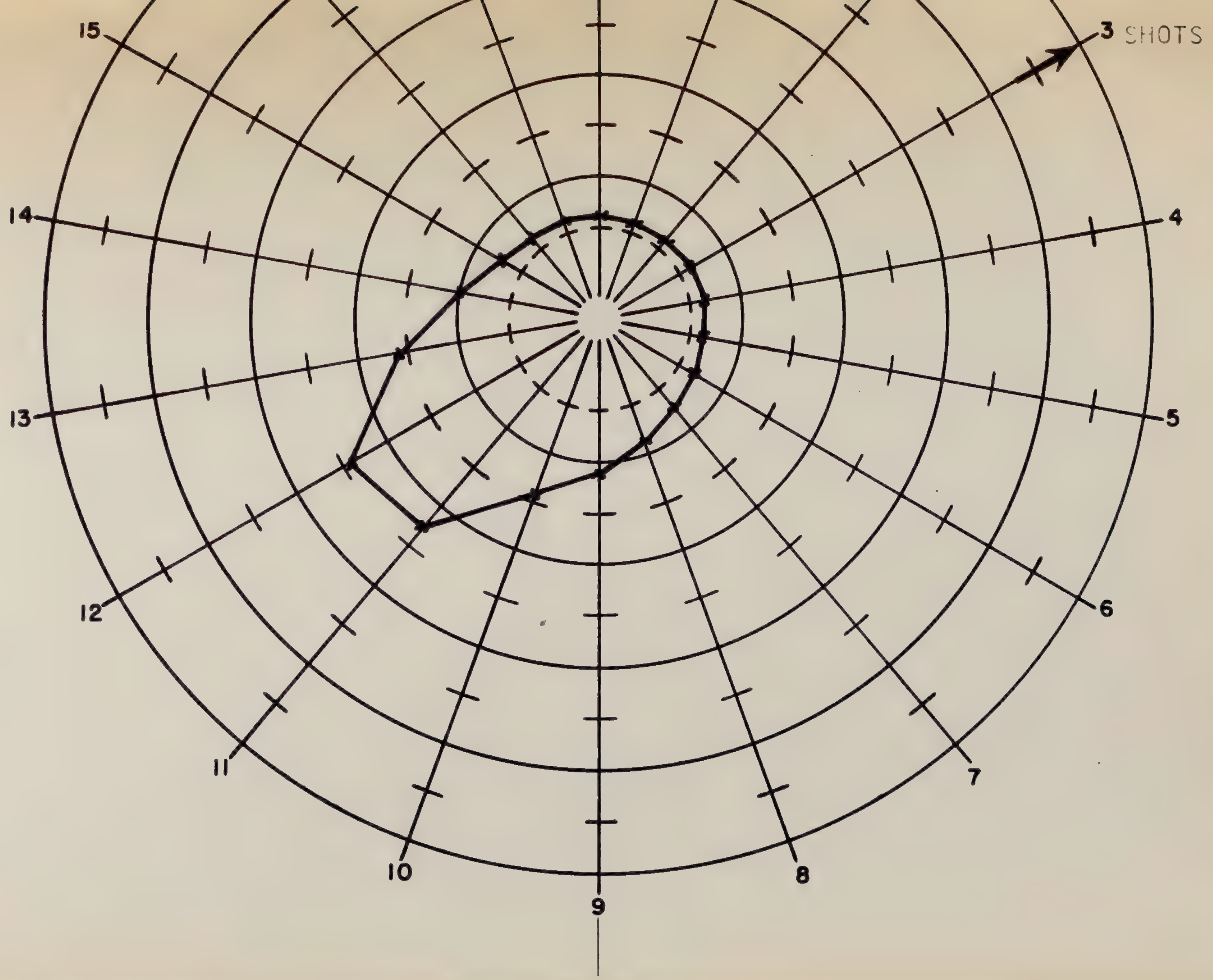
Schlumberger

RADIORIENTATION PLOT

POT-B

NO.1-LONG STRING-11 SHOTS GUN NO.17 PERFORATIONS 1306-1316 ONE SHOT PER FOOT



This chart computation and/or interpretation of our readings from our gamma-gamma orientation and de-

tecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by vagrant metal in the drill hole and other conditions unknown to us.

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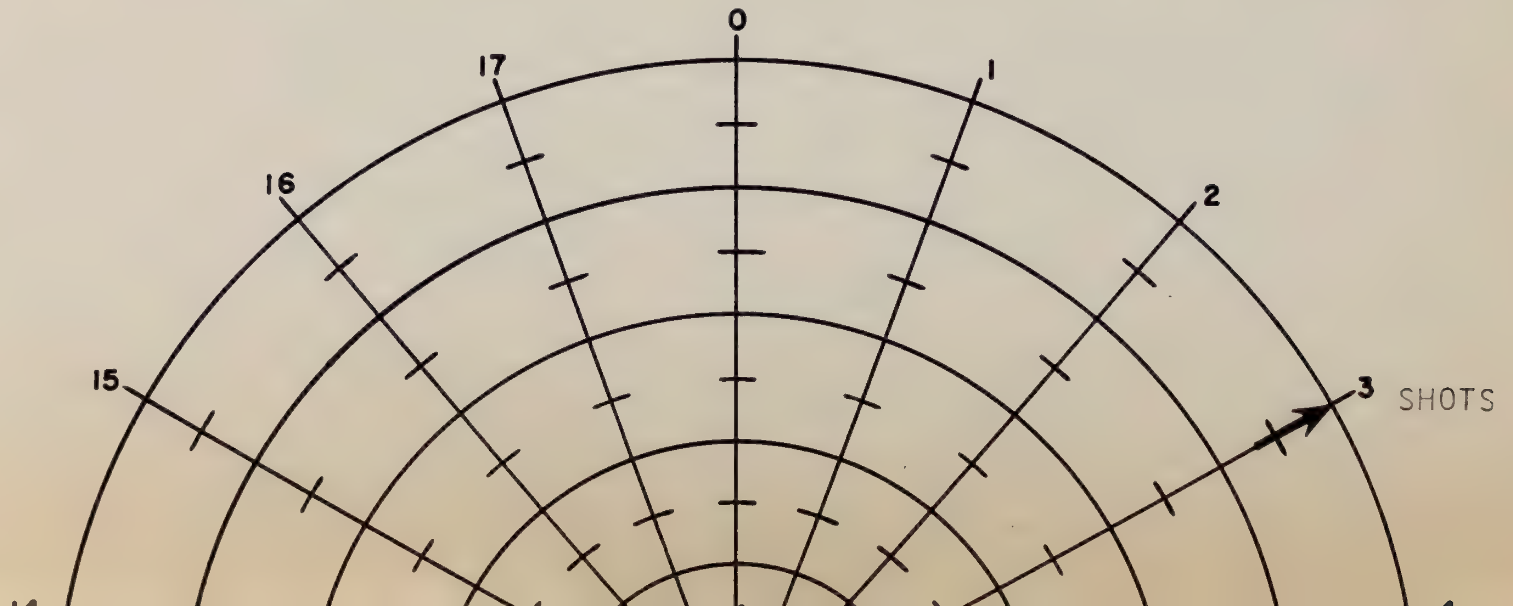
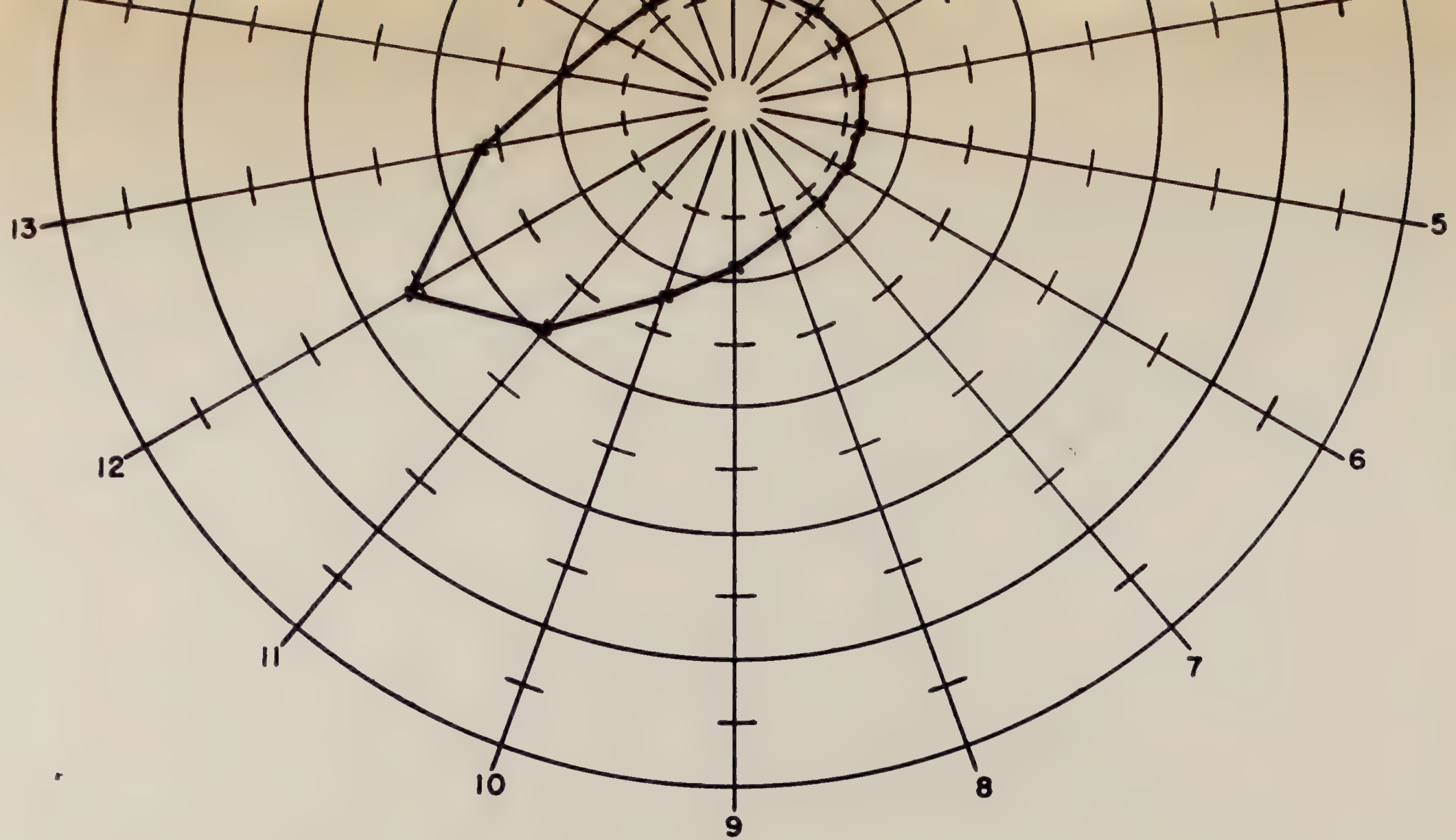
RADIORIENTATION PLOT

POT-B

NO.1-LONG STRING-10 SHOTS GUN NO.18 PERFORATIONS 1296-1305 ONE SHOT PER FOOT





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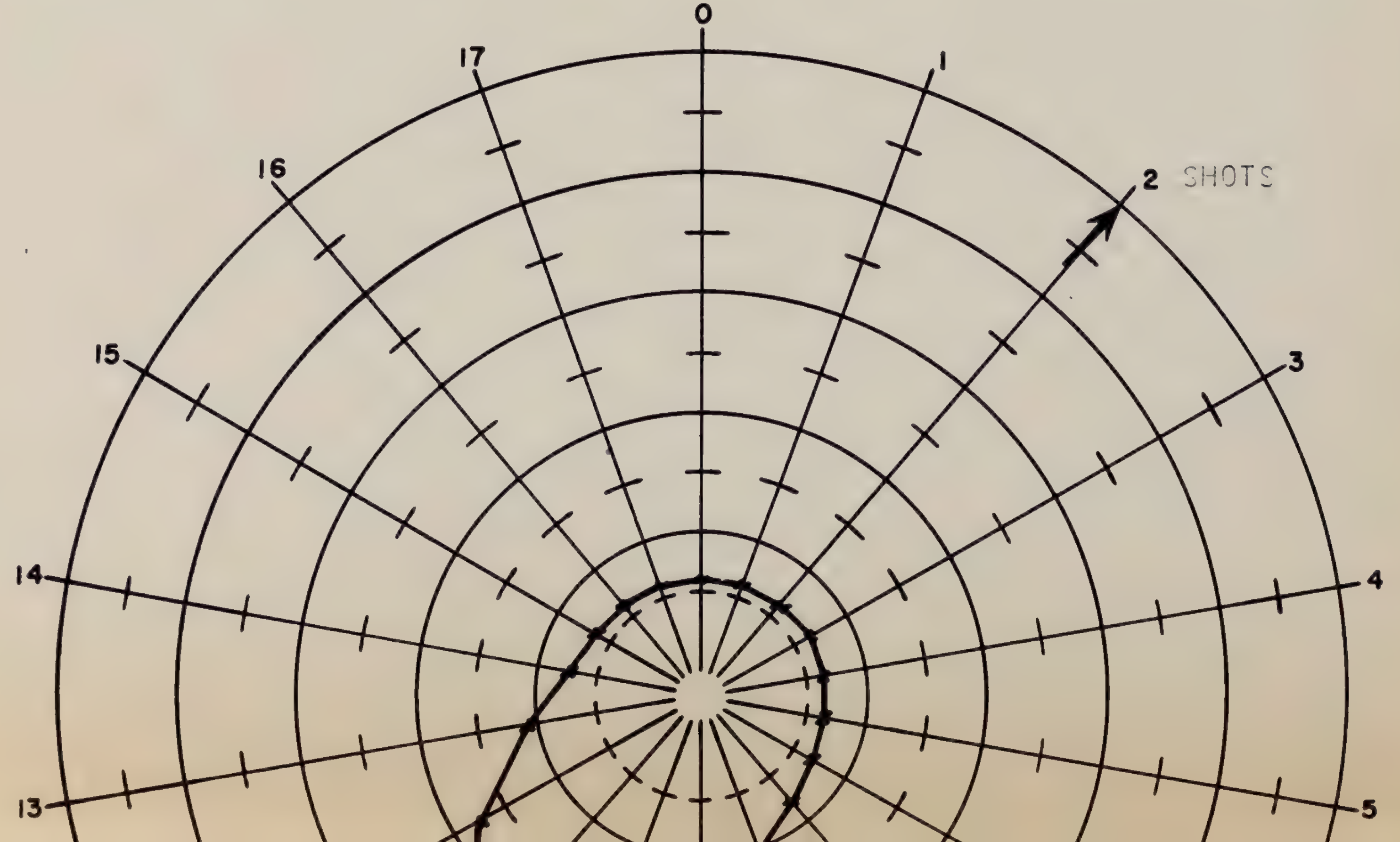
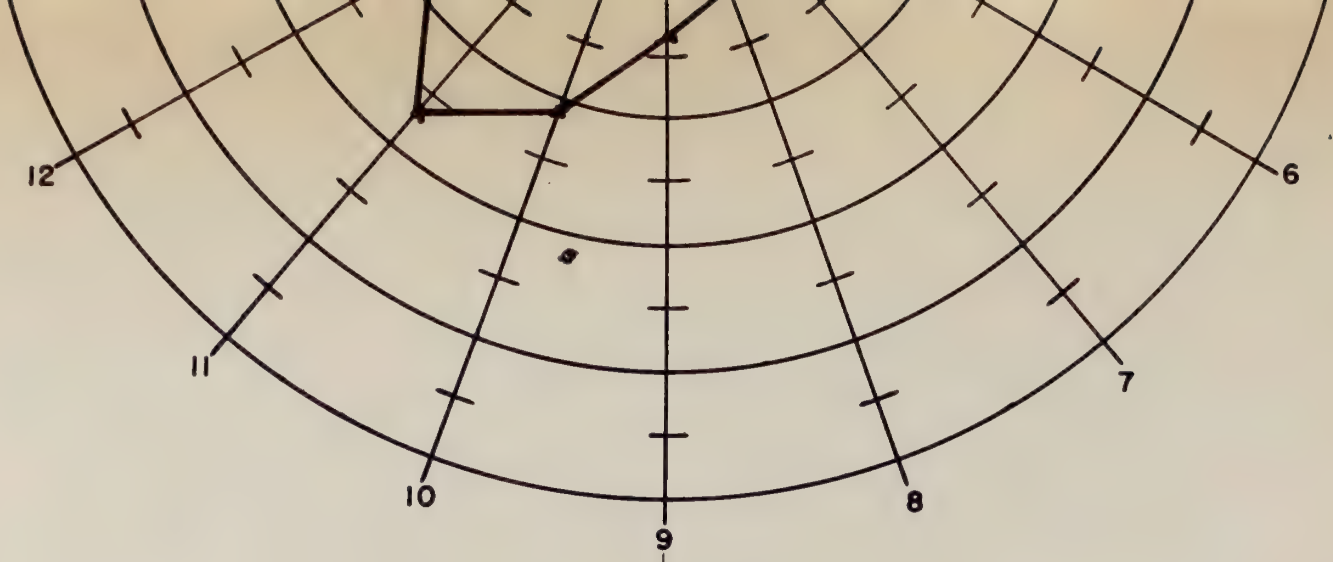
RADIORIENTATION PLOT

POT-B

NO.1-LONG STRING-4 SHOTS GUN NO.19 PERFORATIONS 1292-1295 ONE SHOT PER FOOT





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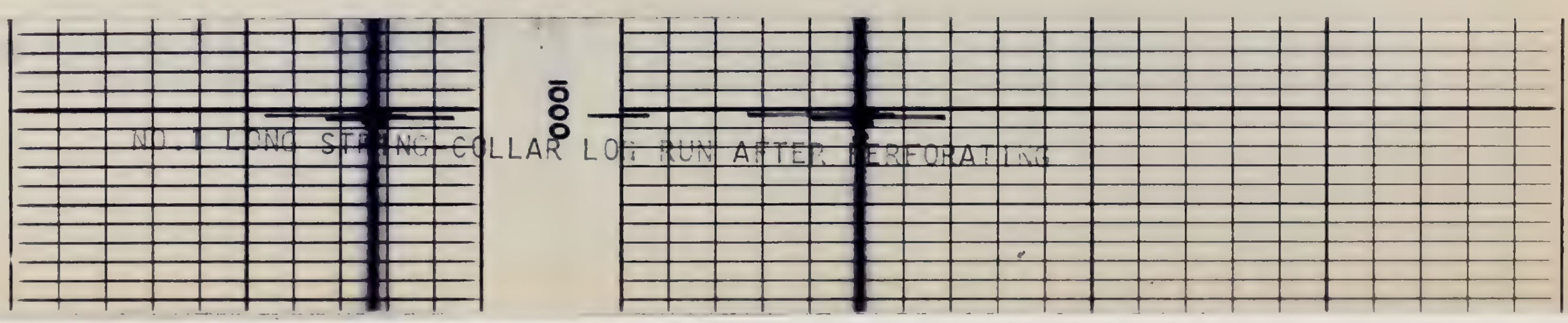
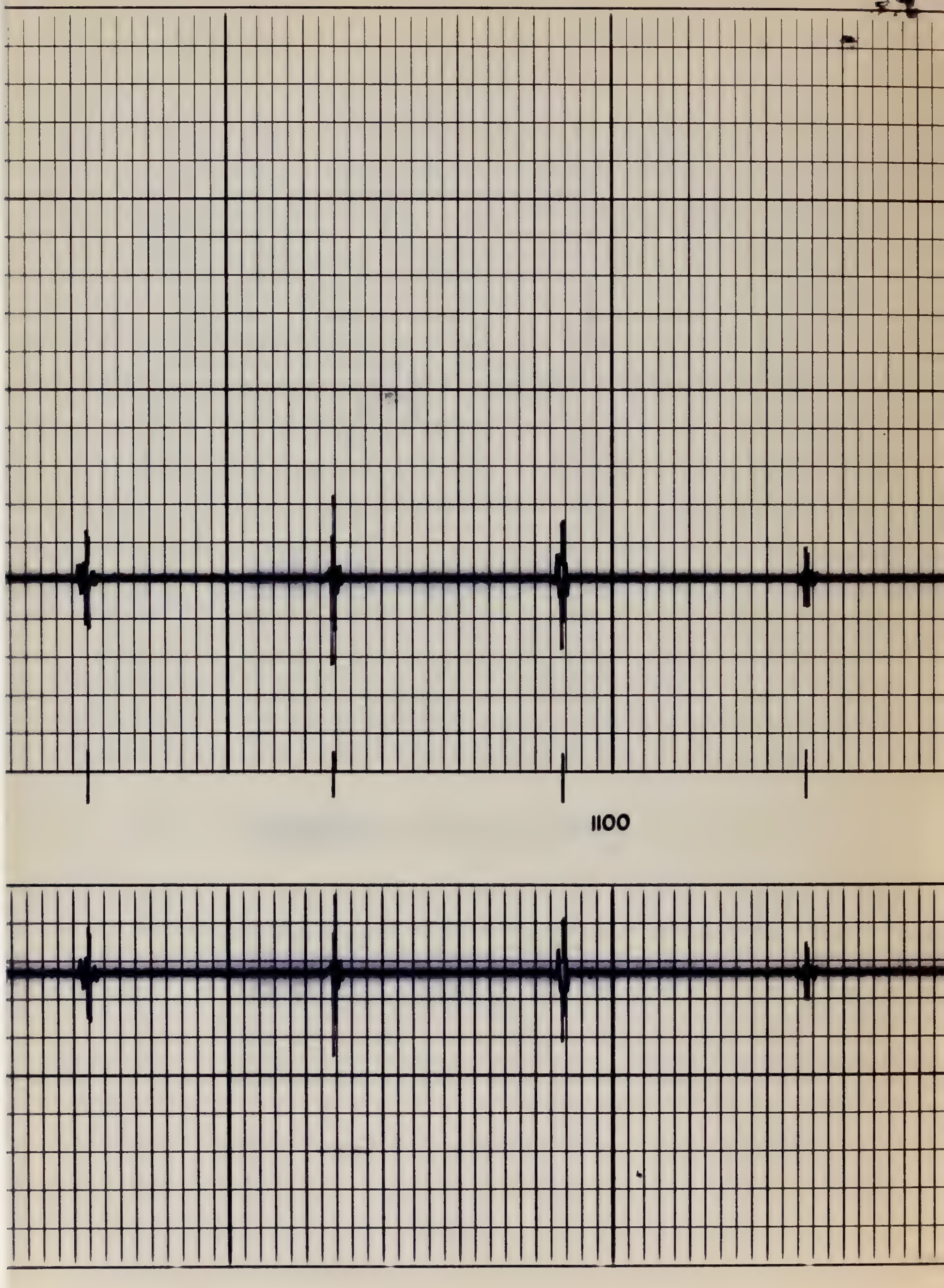
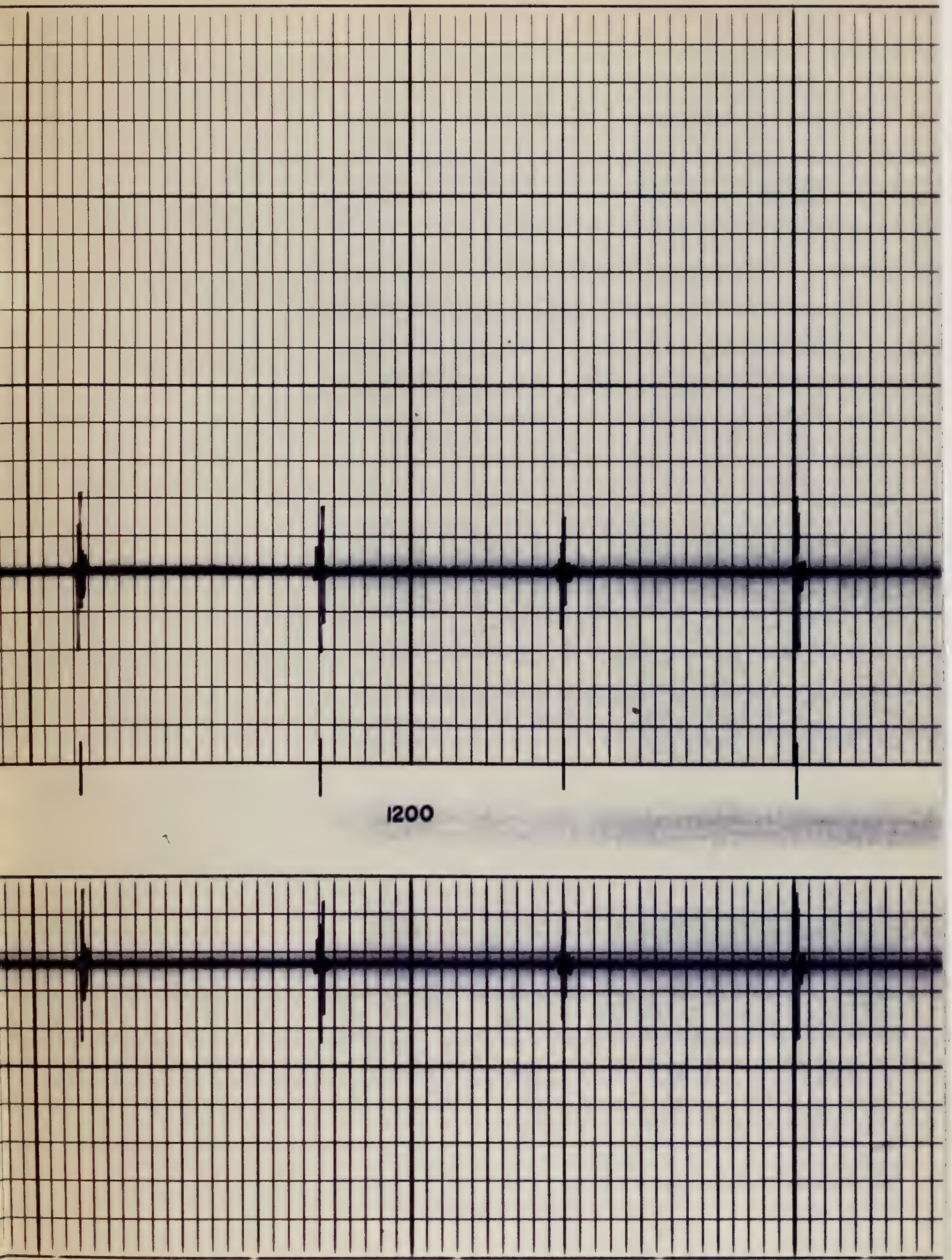
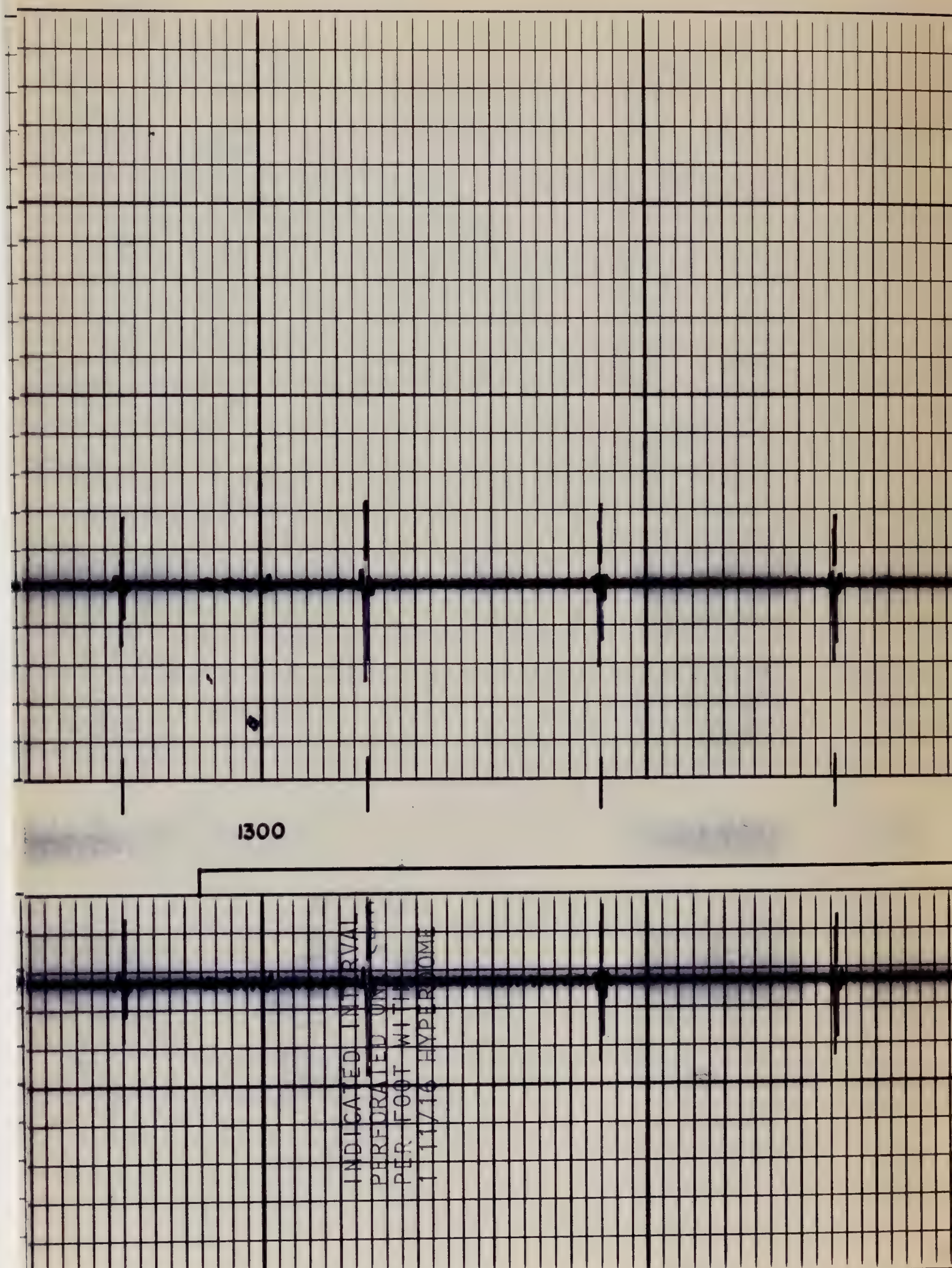
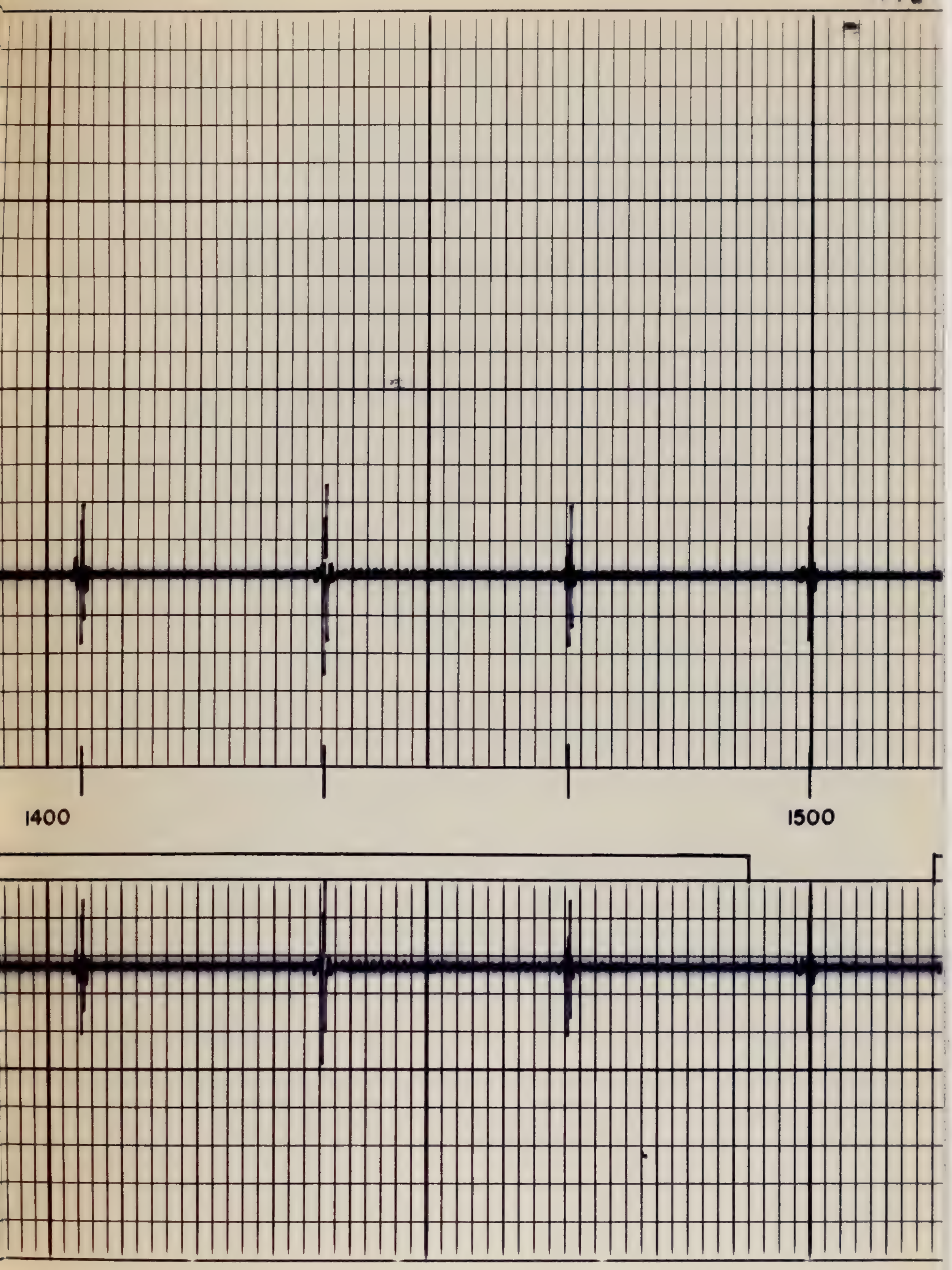
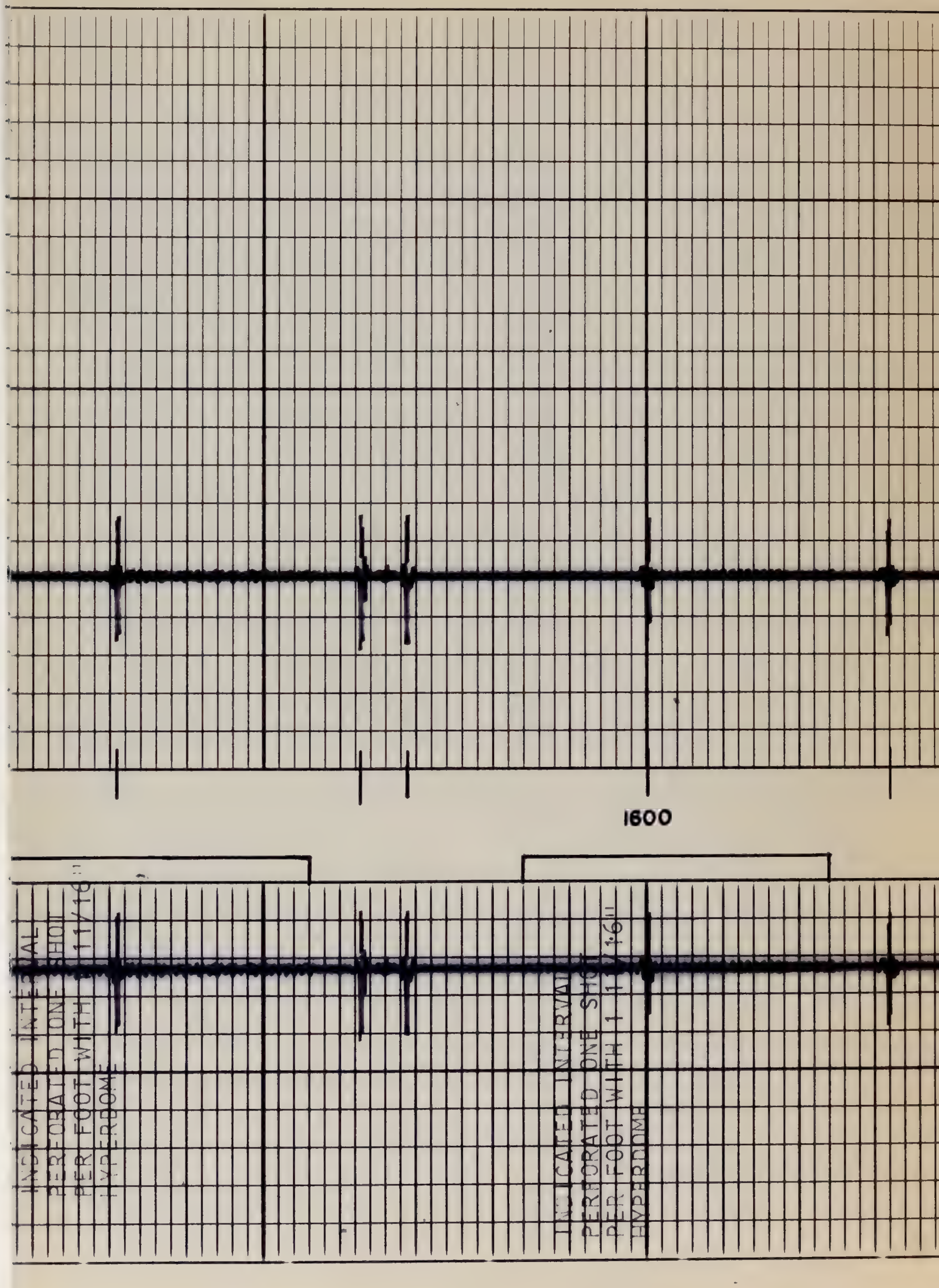


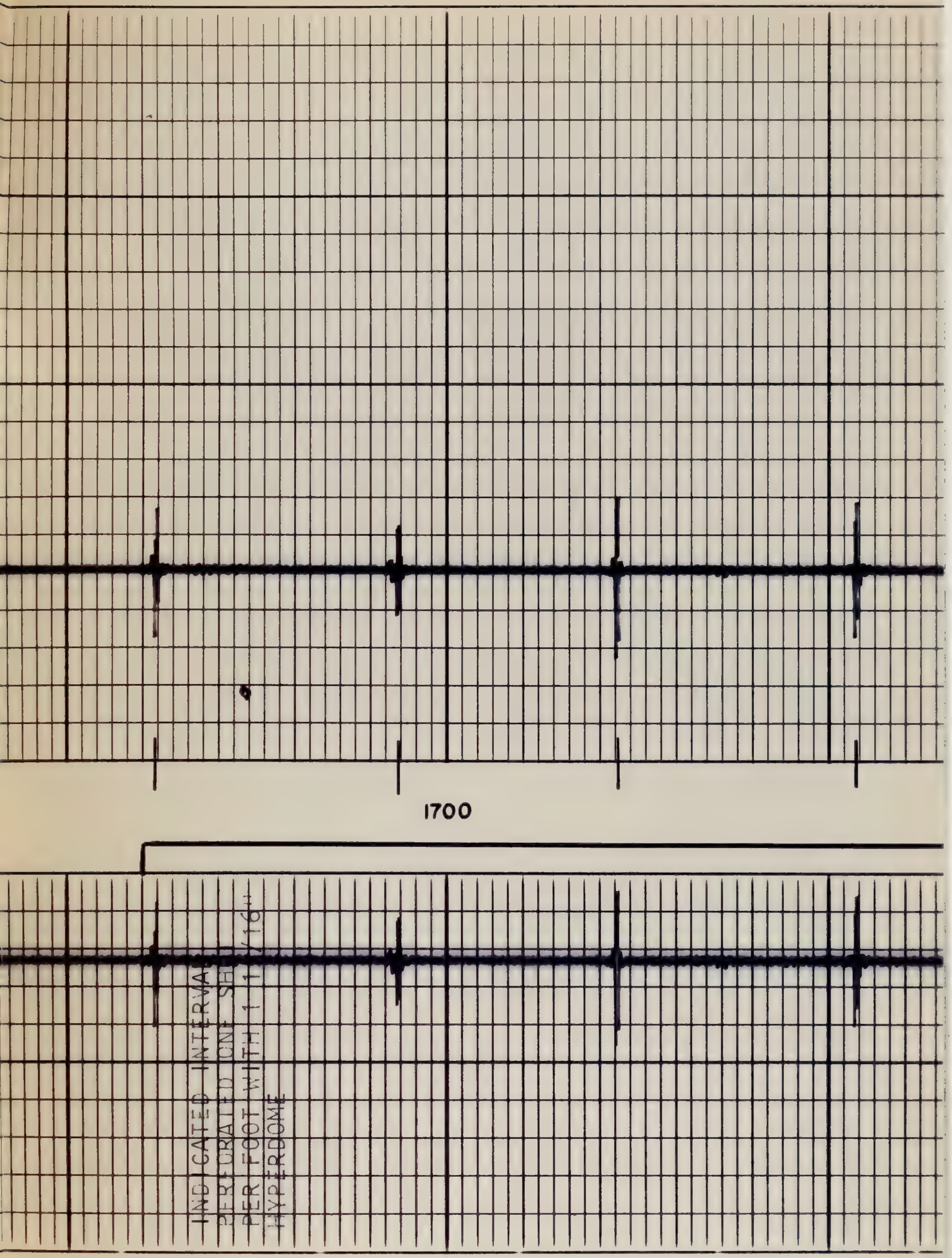

1100

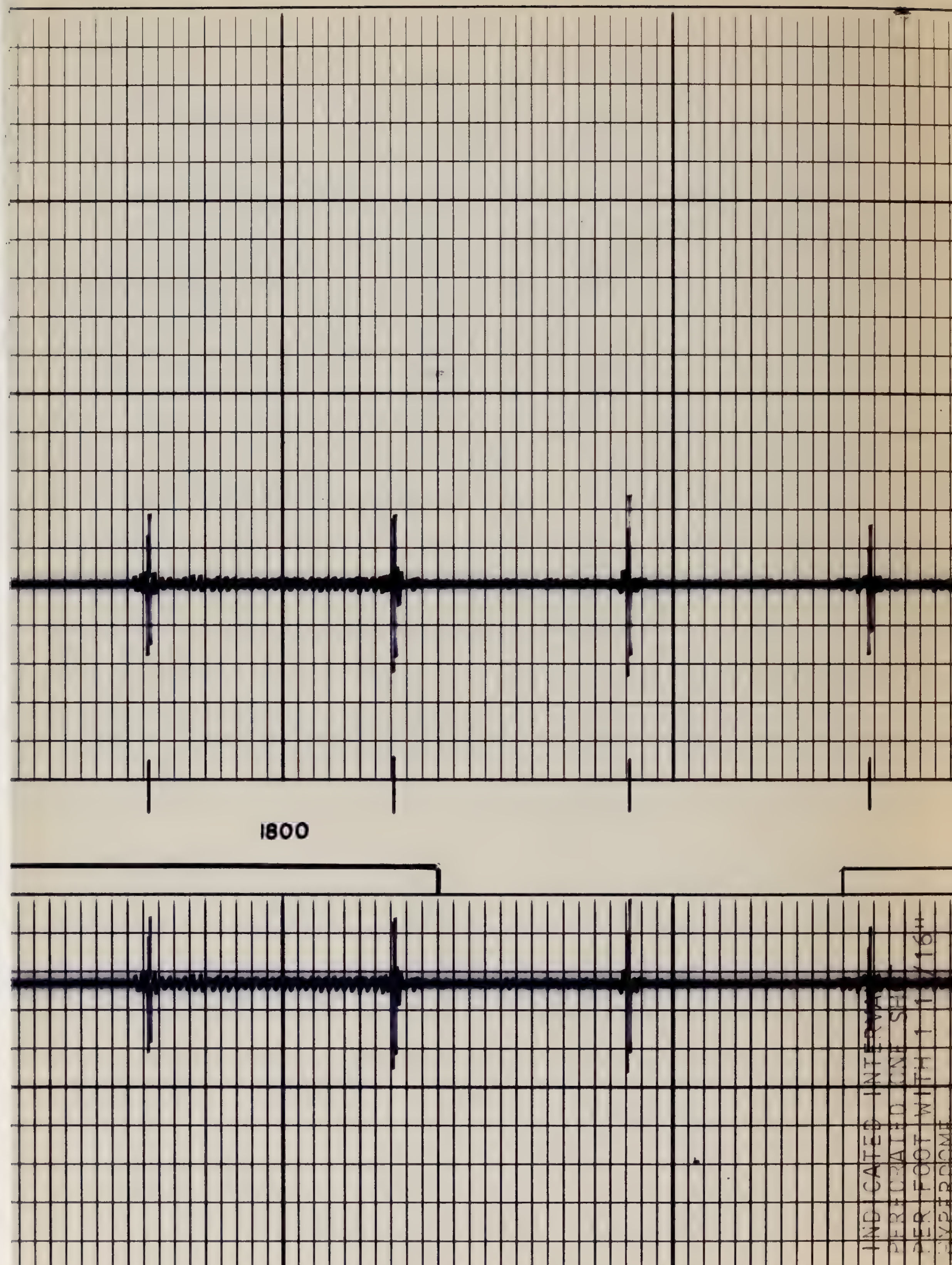

1200

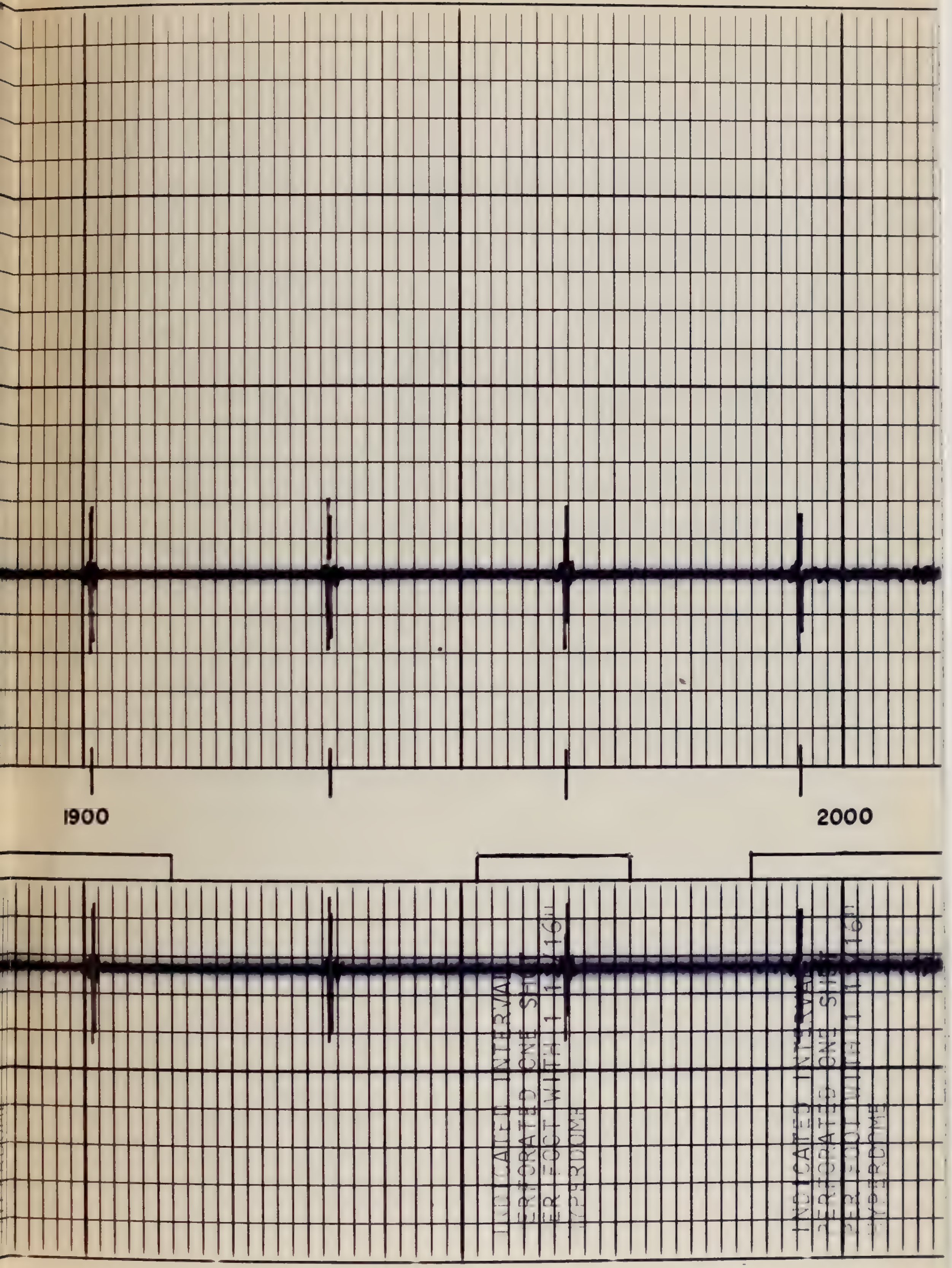

1300
INDICATED INTERVAL
PERFORATED ON
PER FOOT WITH
1 11/16 HYPERDOME

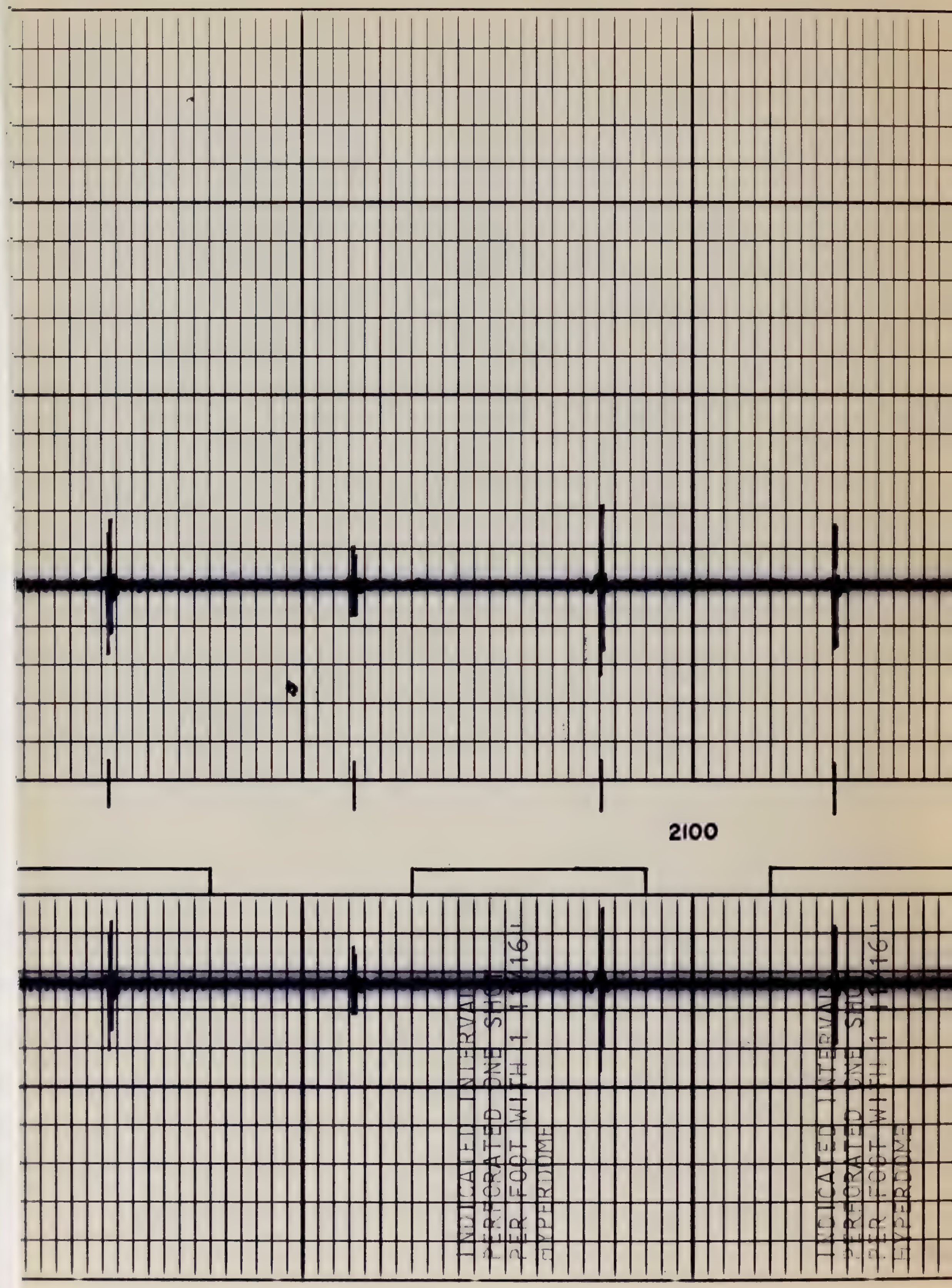

1400
1500

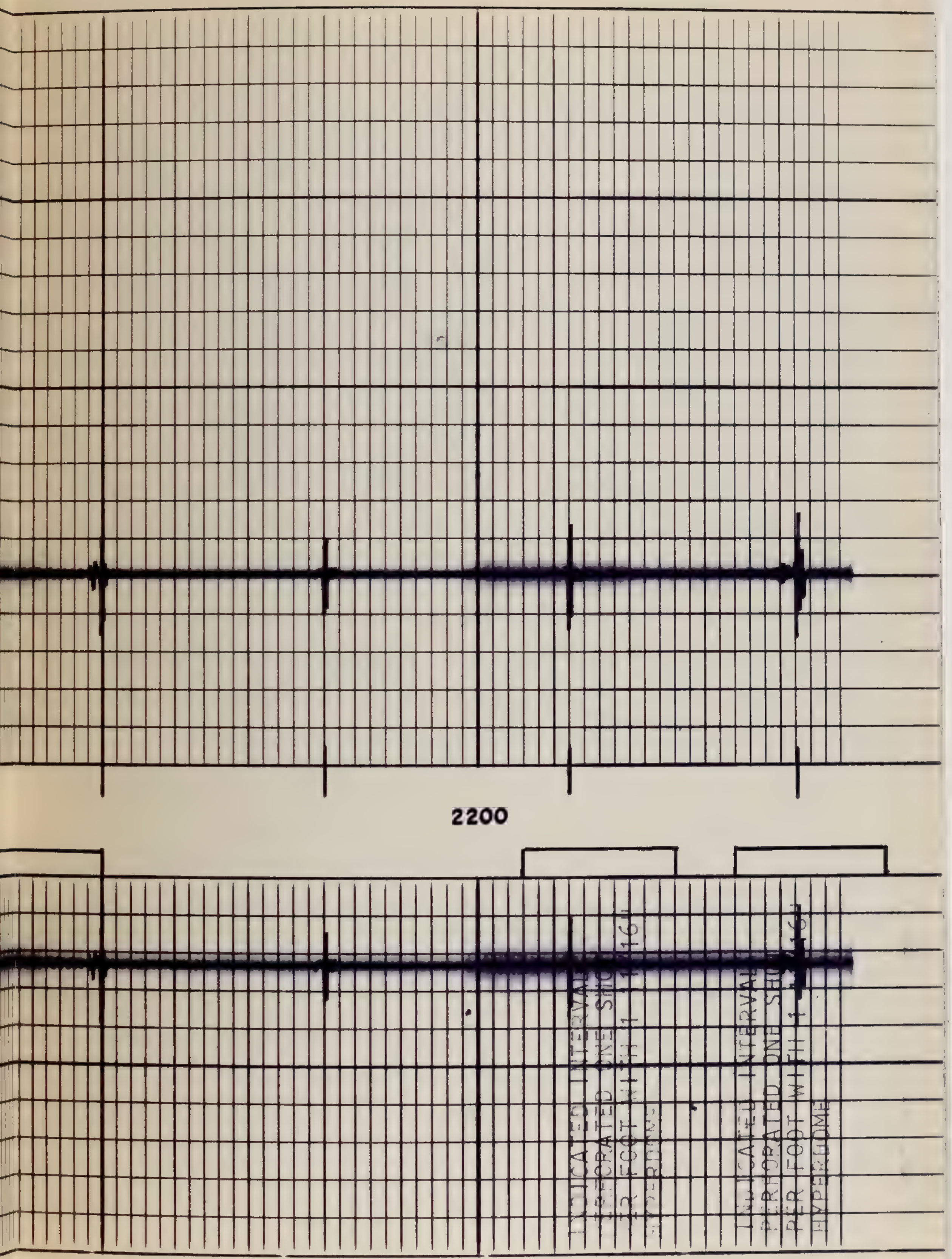

1600
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH 1 11/16"
HYPERDOME
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH 1 11/16"
HYPERDOME

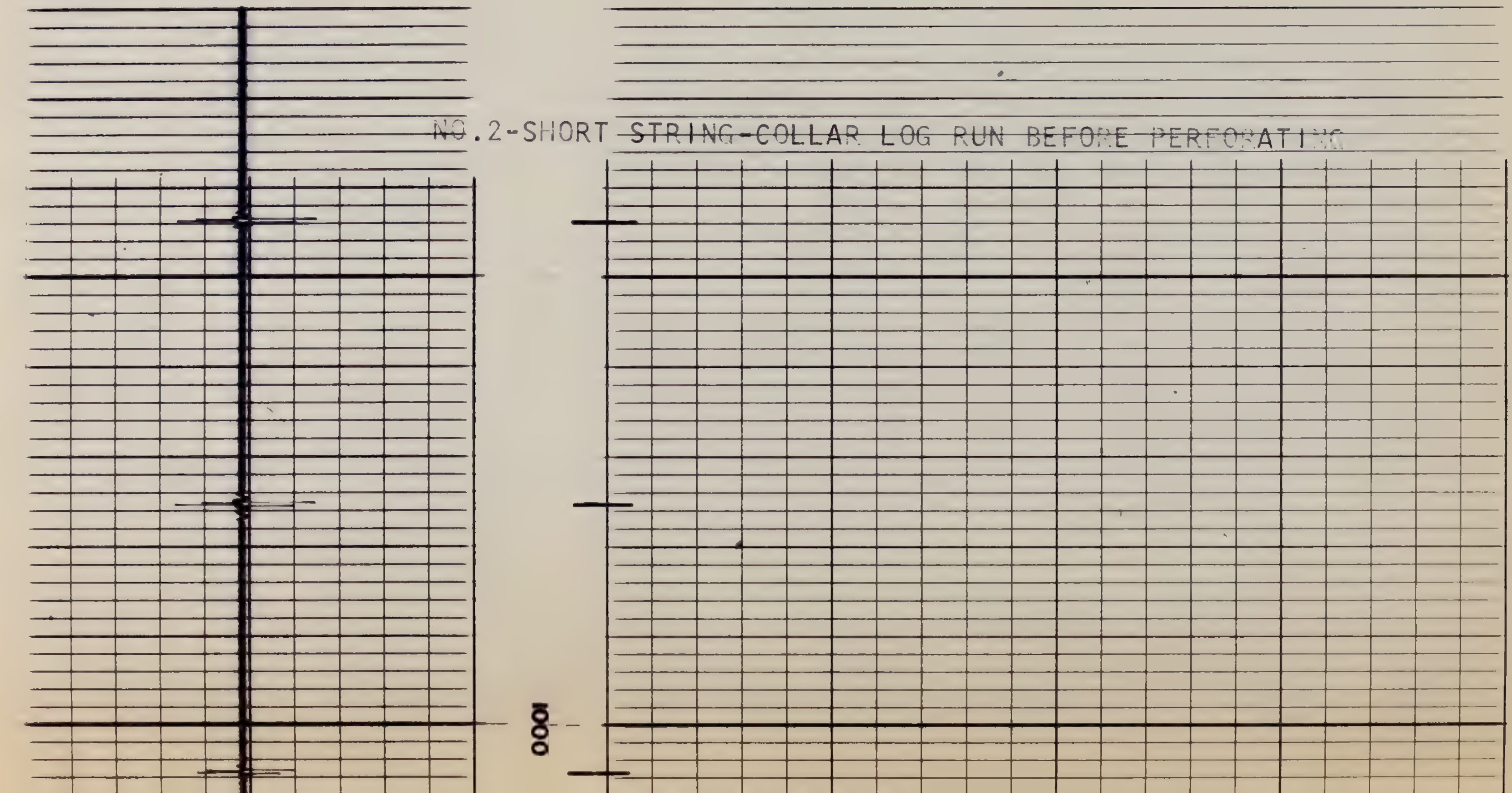

1700
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH 1 11/16"
HYPERDOME


1800
INDICATED INTERVA
PERFORATED ONE SH
PER FOOT WITH 1 1/16"

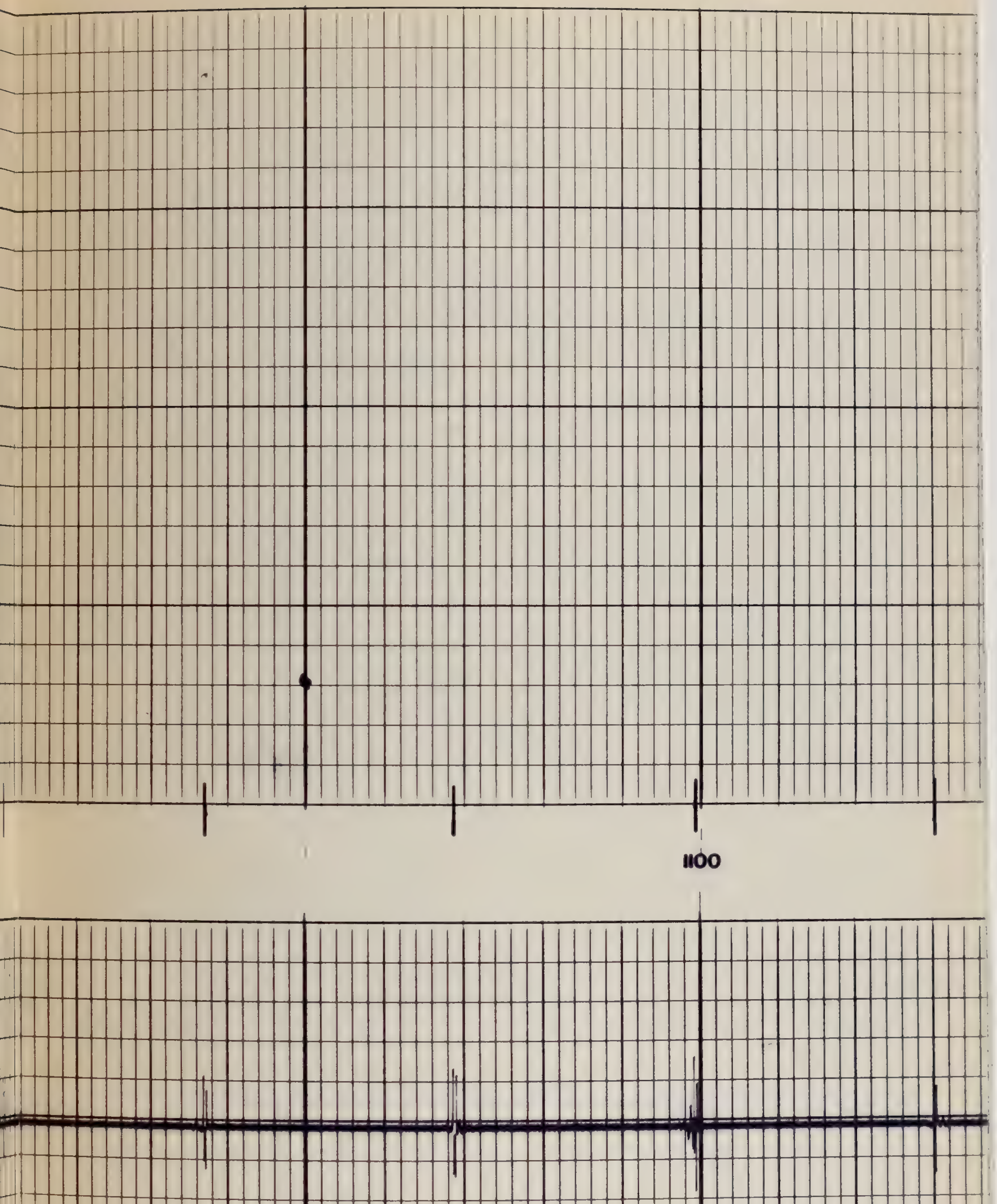

1900
2000
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH 1 11/16"
HYPERDOME
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH 1 11/16"
HYPERDOME

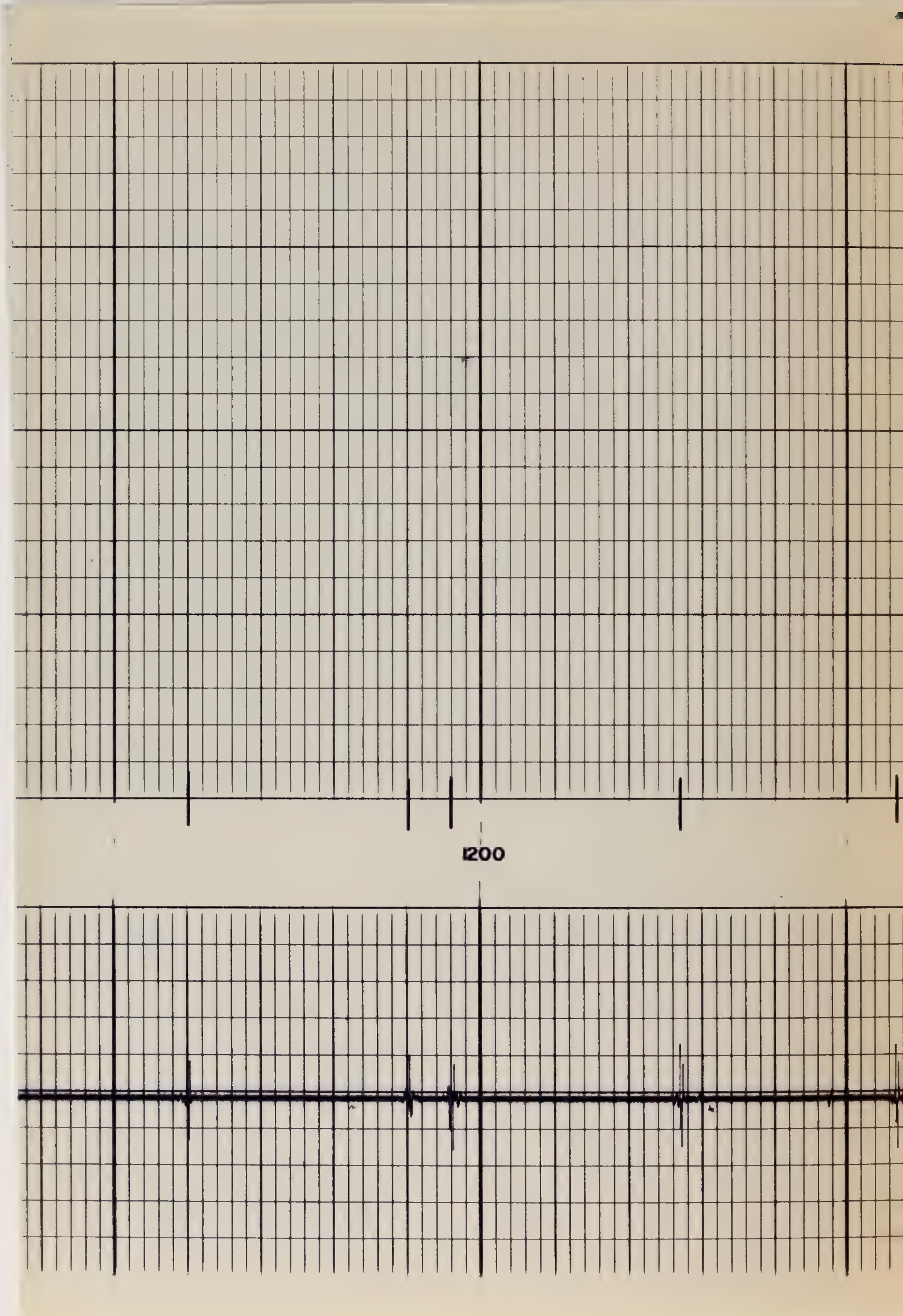

2100
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH 1 11/16"
HYPERDOME
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH 1 11/16"
HYPERDOME

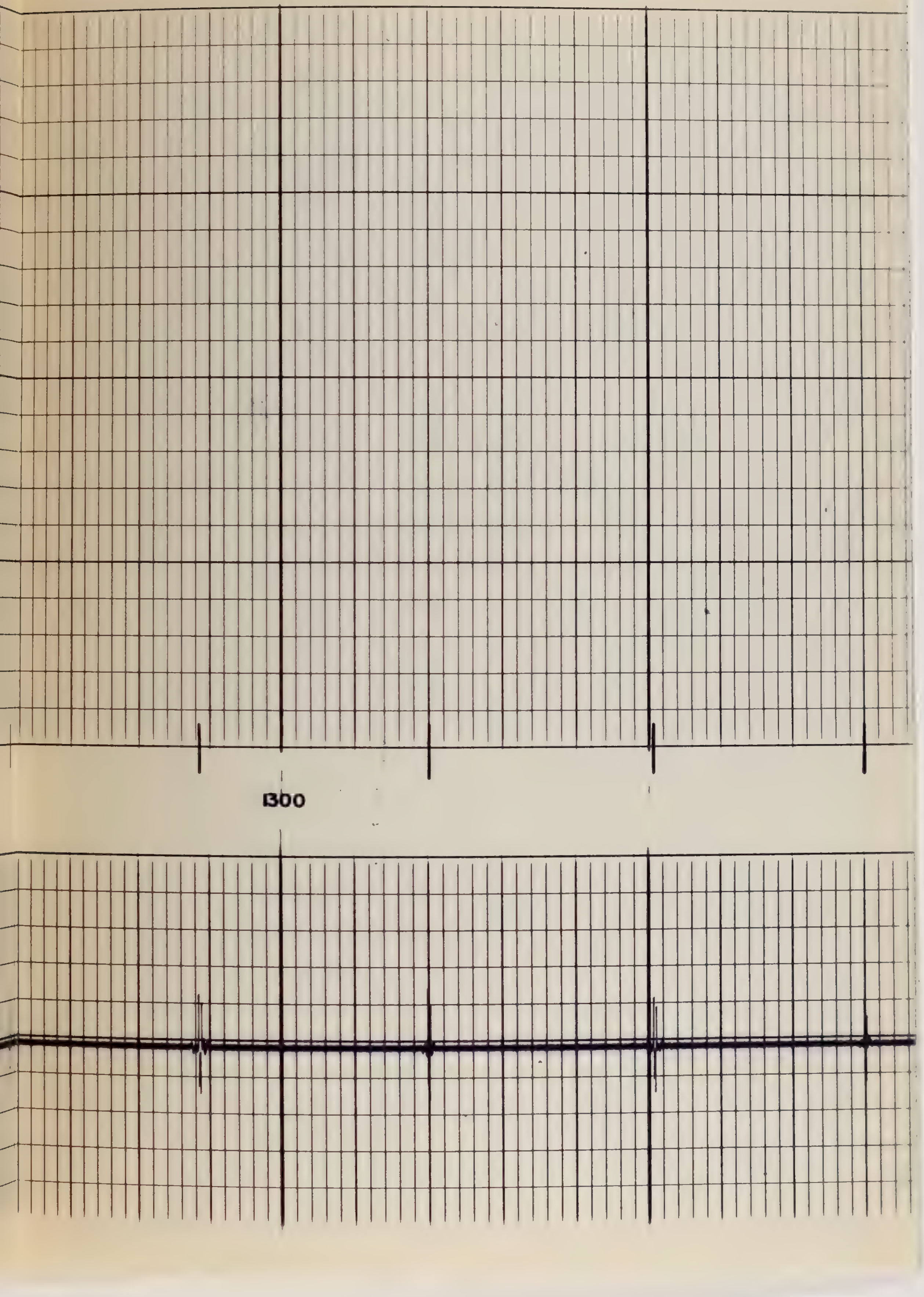

2200
INDICATED INTERVAL PERFORATED ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME
INDICATED INTERVAL PERFORATED ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME

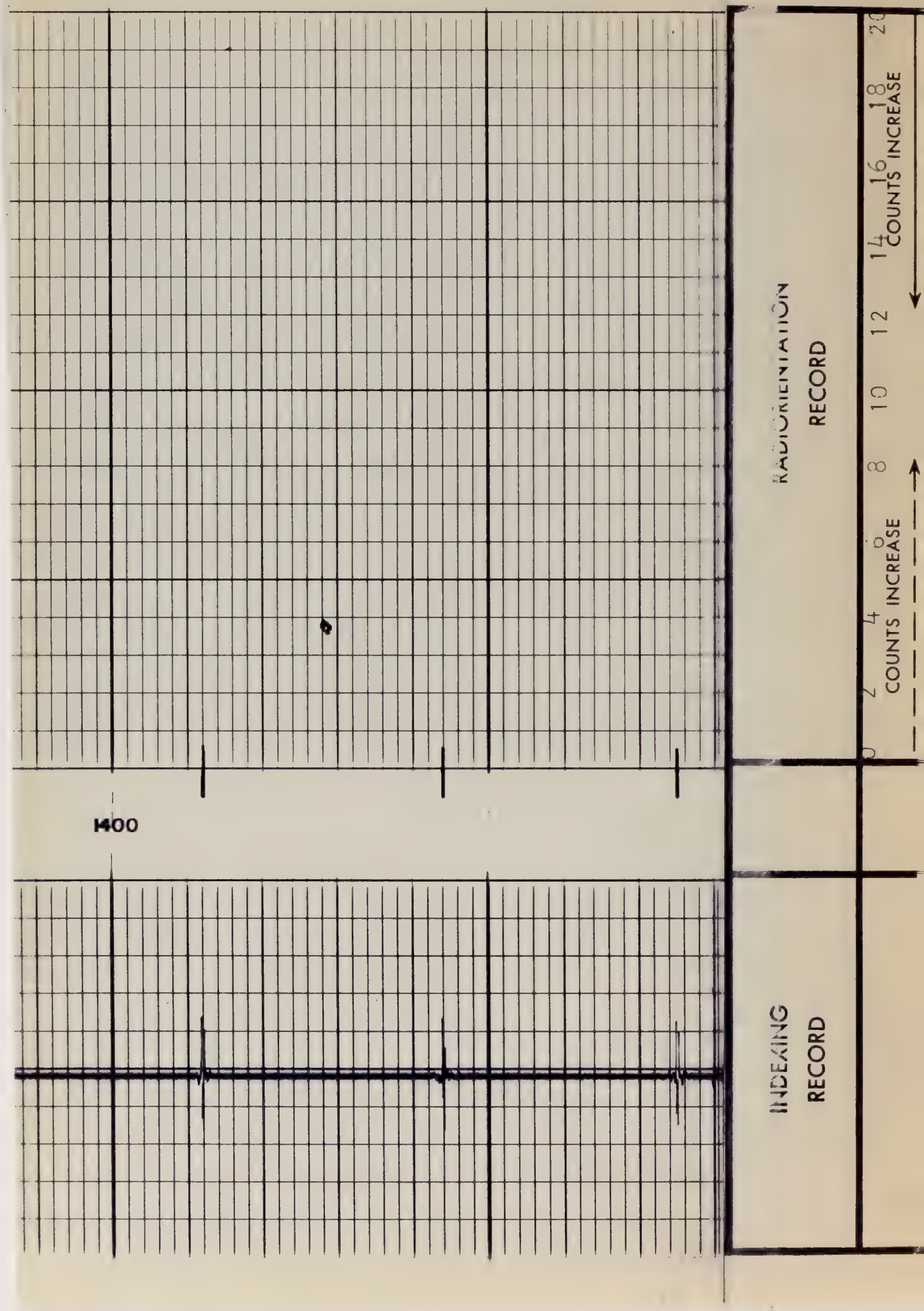


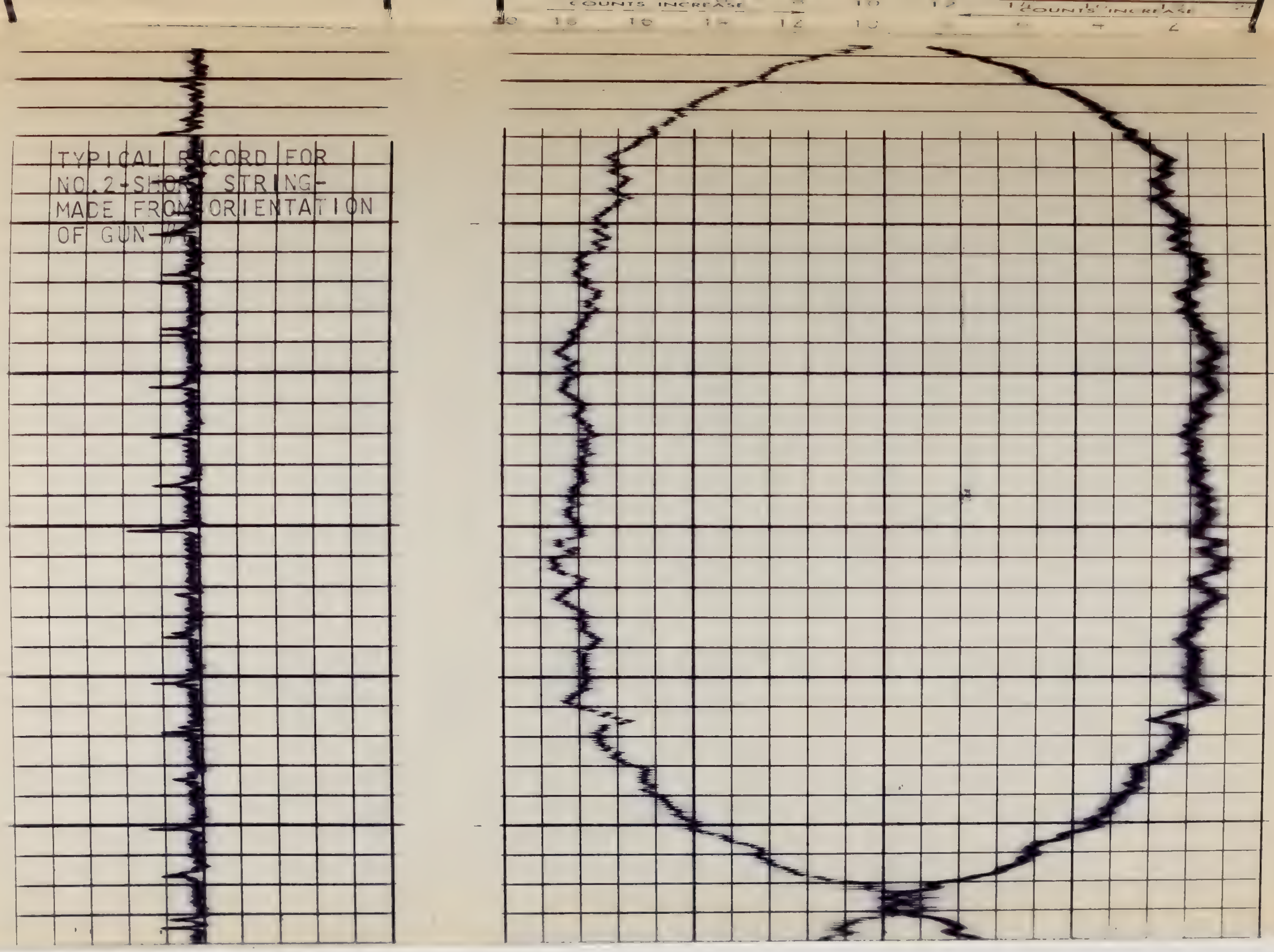
NO.2-SHORT STRING-COLLAR LOG RUN BEFORE PERFORATING


1100

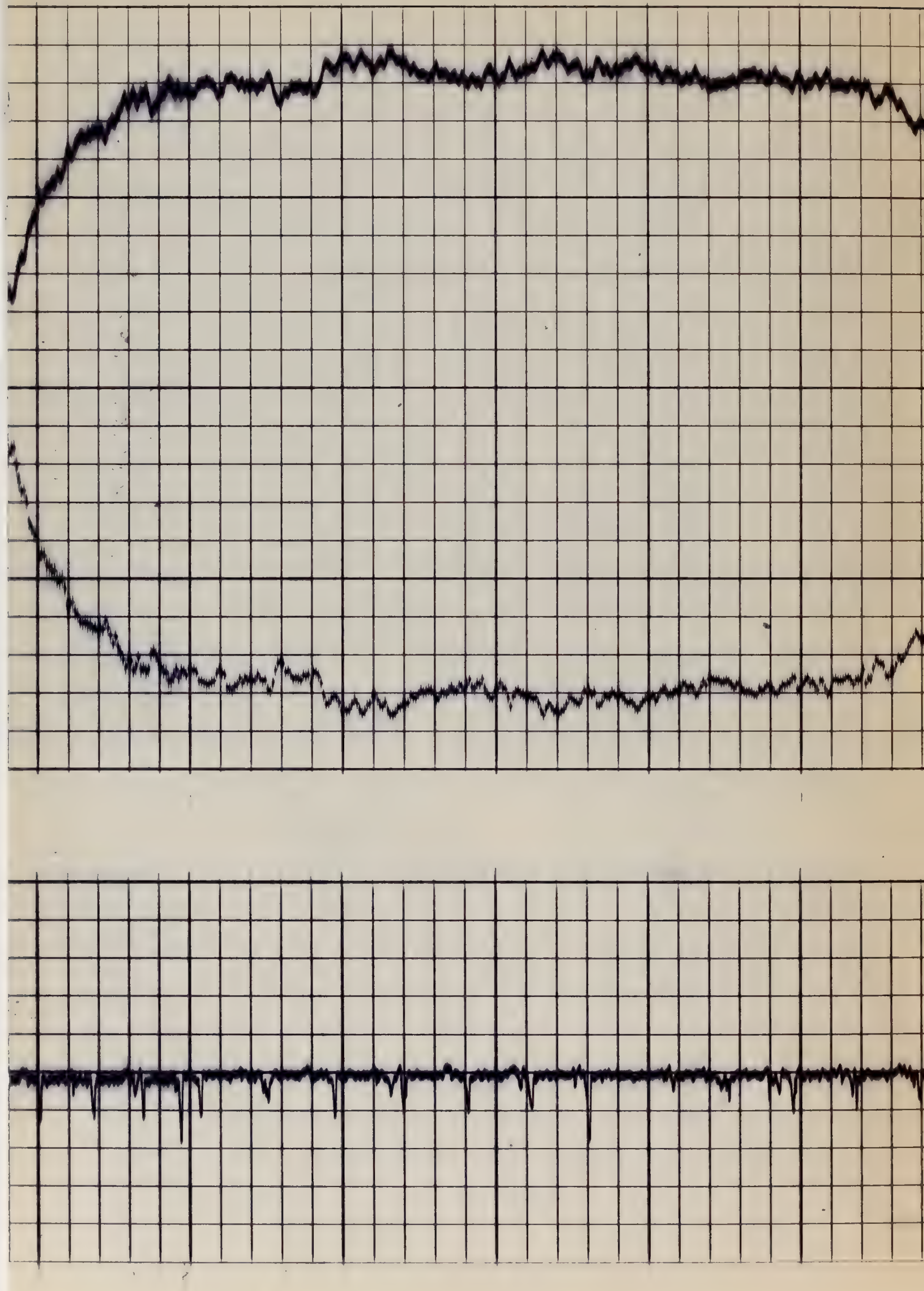

1200

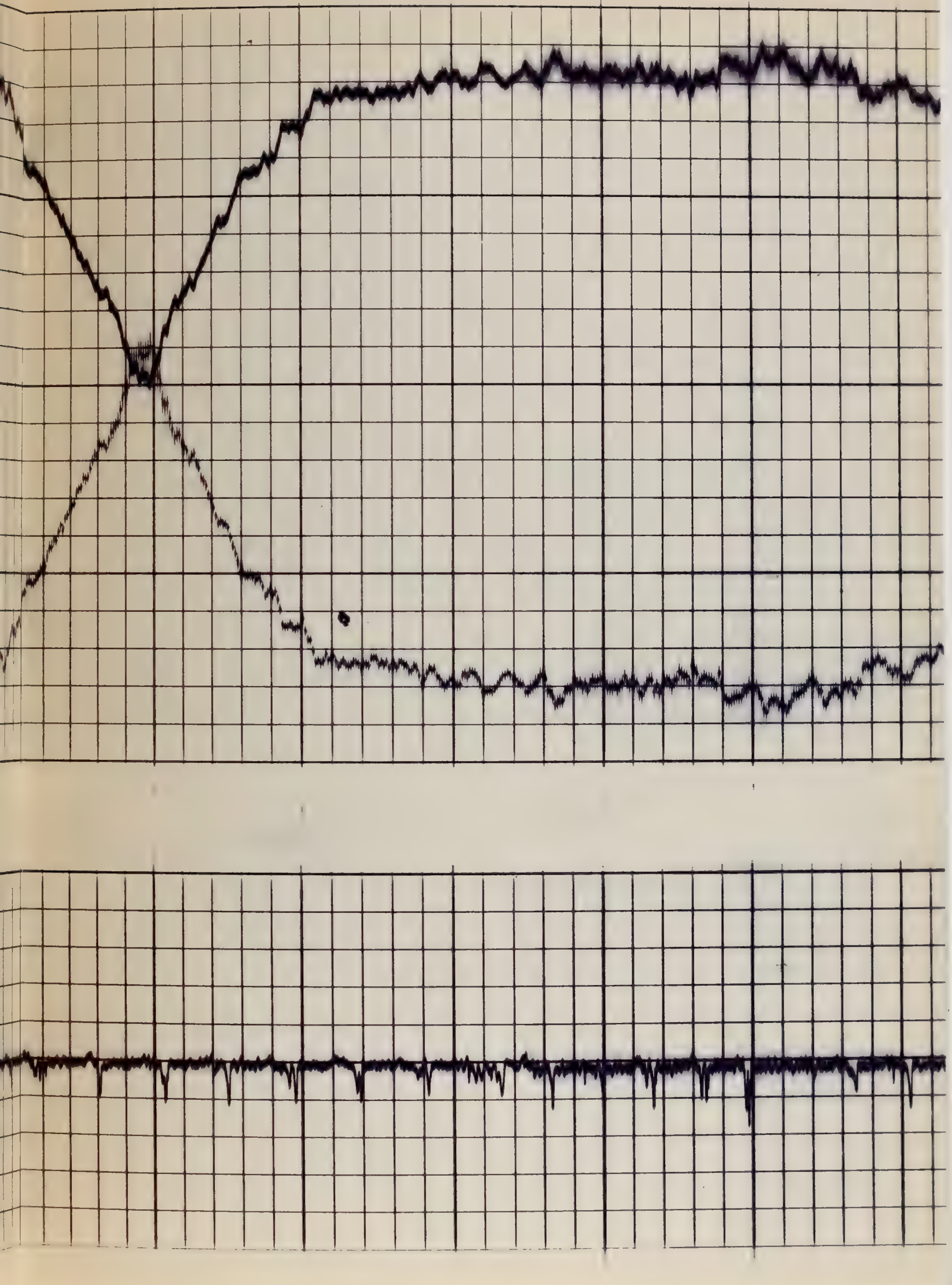

1300

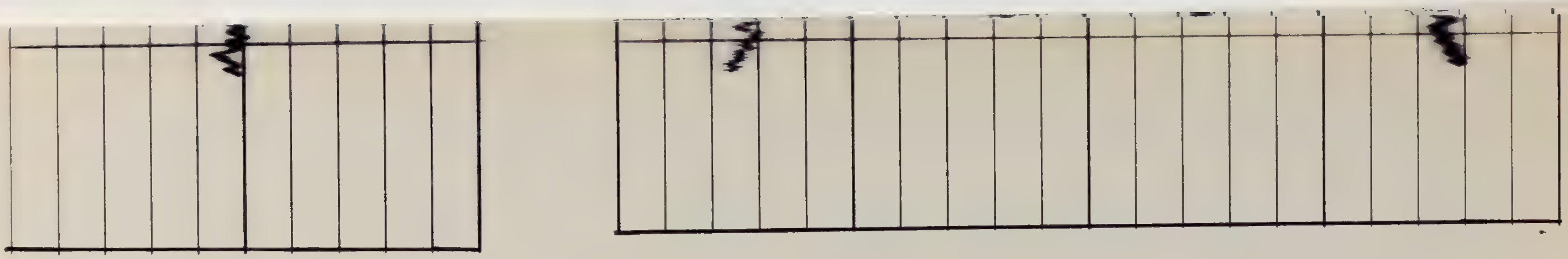

RADIORIENTATION
RECORD
0
2
4
6
8
10
12
14
16
18
20
COUNTS INCREASE
COUNTS INCREASE
1400
INDEXING
RECORD



TYPICAL RECORD FOR
NO. 2-SHORT STRING-
MADE FROM ORIENTATION
OF GUN #



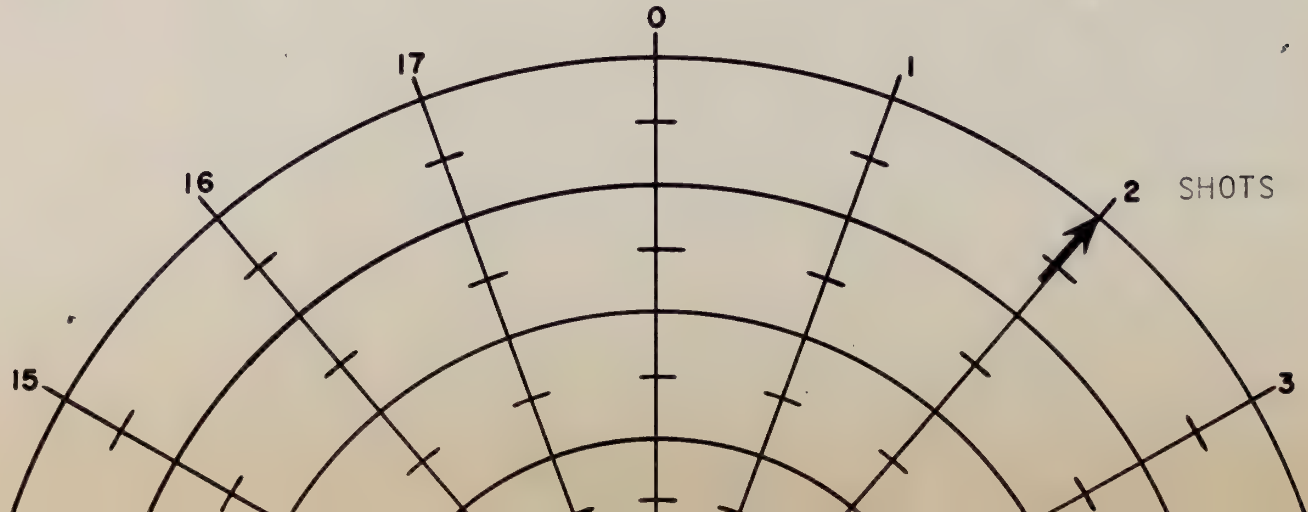


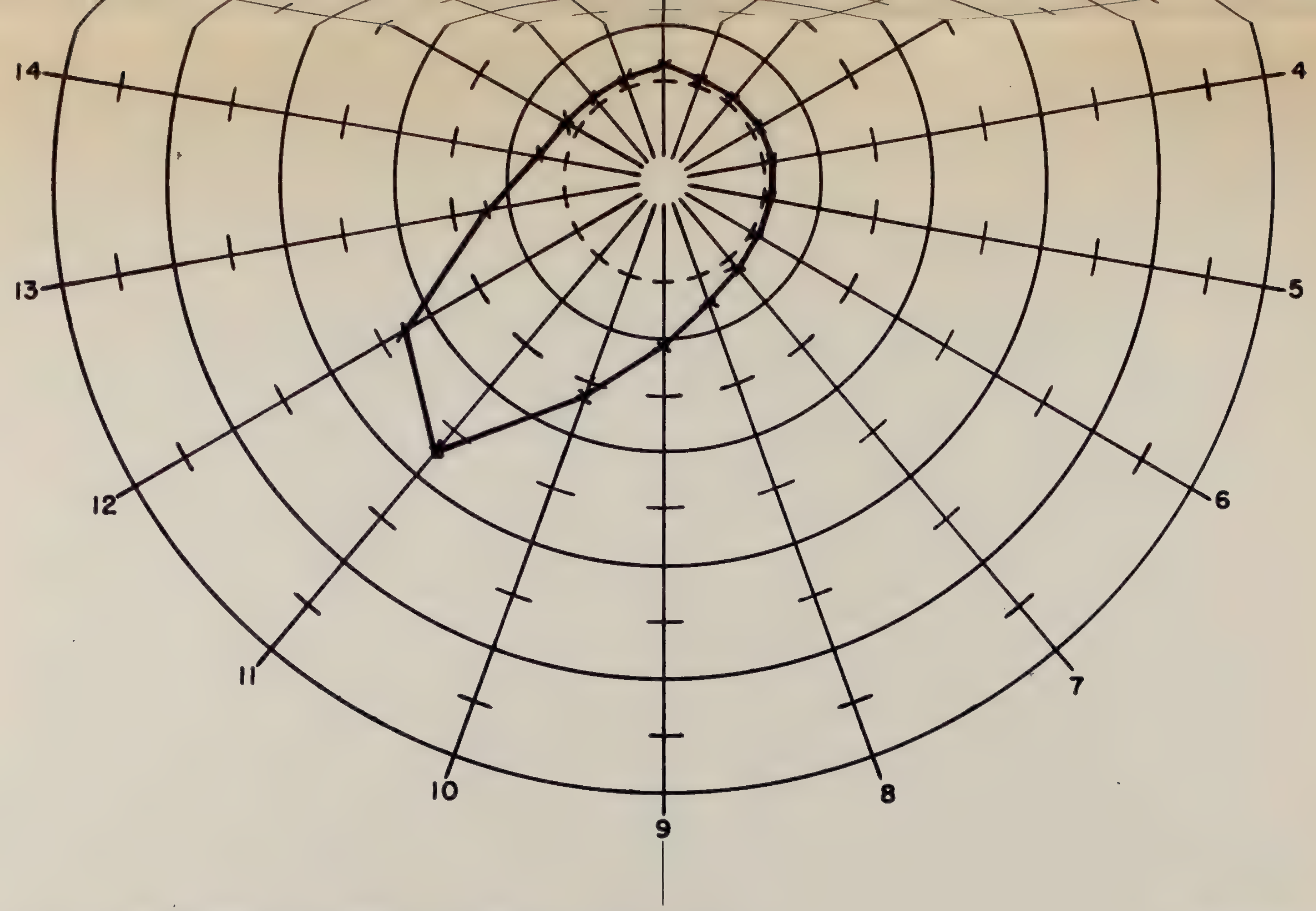


RADIORIENTATION PLOT

POT-B

NO.2-SHORT STRING-11 SHOTS GUN NO.1 PERFORATIONS 1218-1228 ONE SHOT PER FOOT


0
17
1
16
2
SHOTS
15
3



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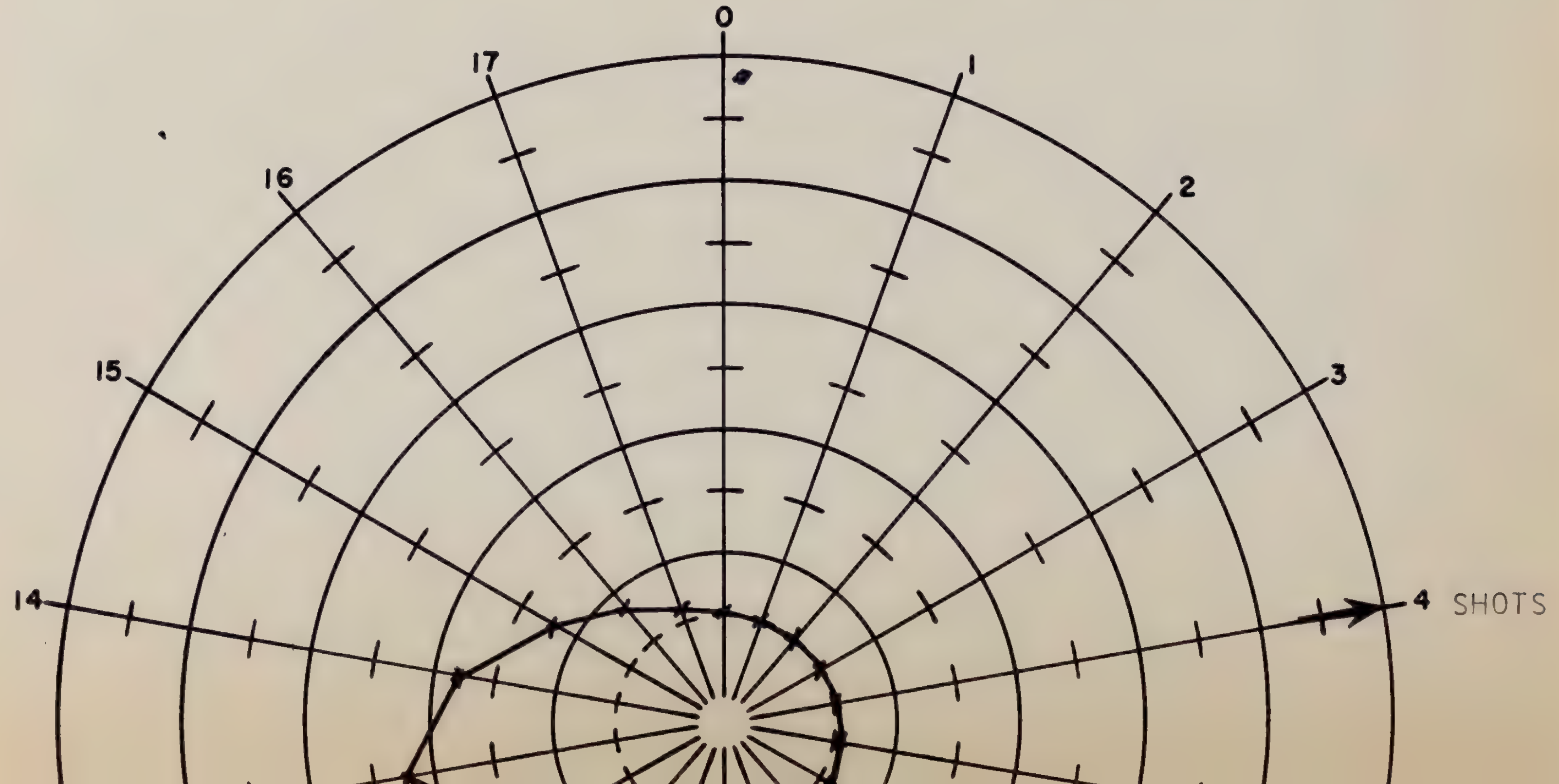
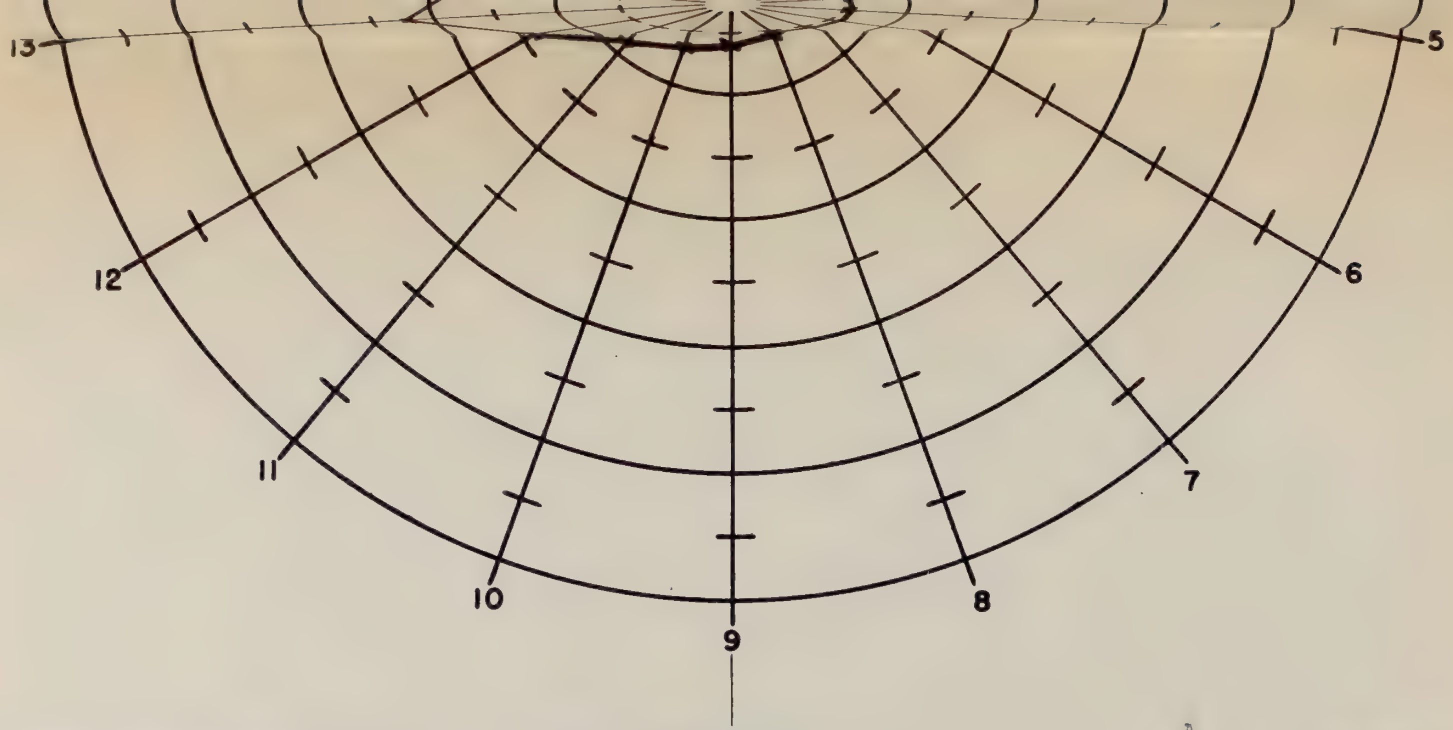
RADIORIENTATION PLOT

POT-B

NO.2-SHORT STRING-11 SHOTS GUN NO.2 PERFORATIONS 1207-1217 ONE SHOT PER FOOT





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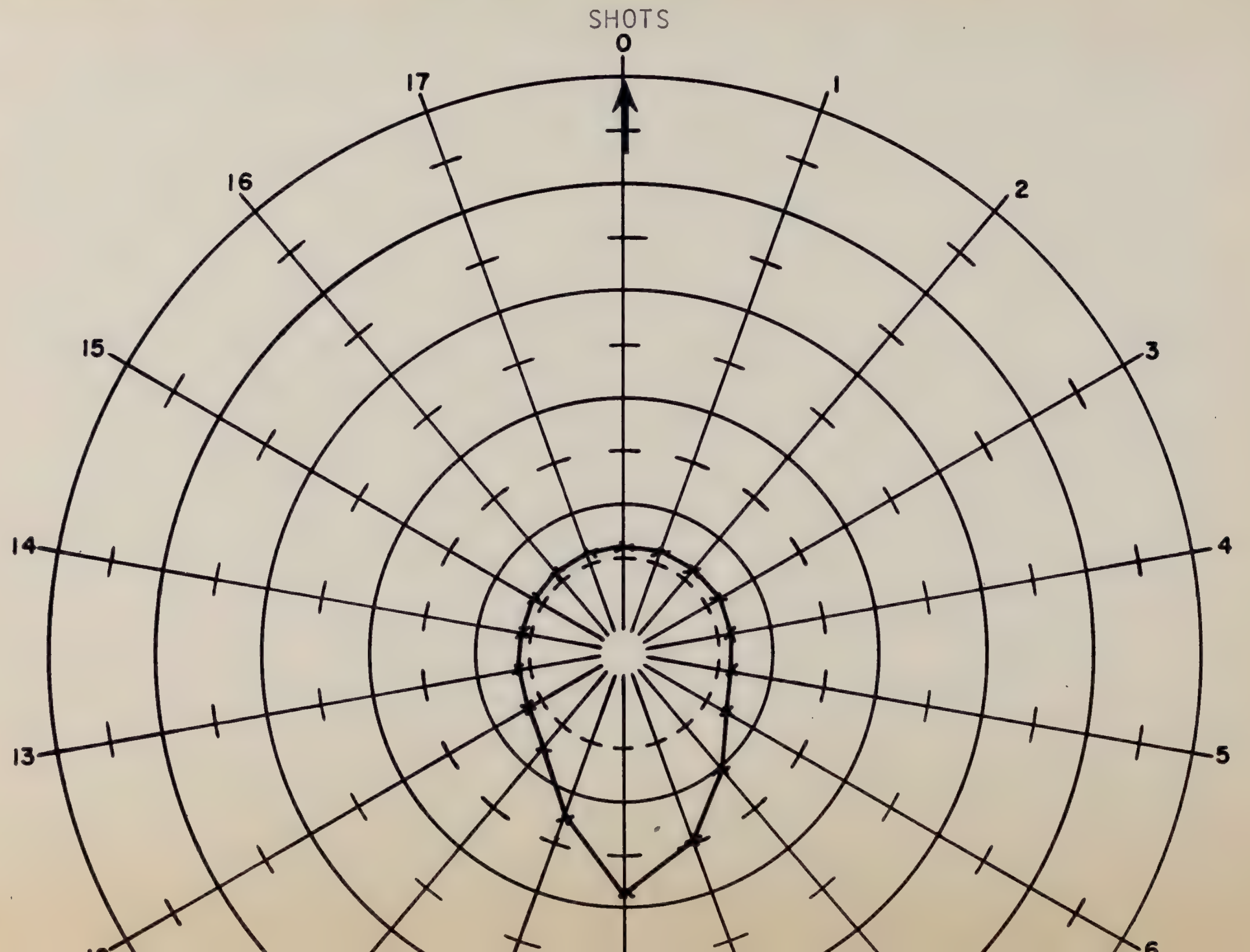
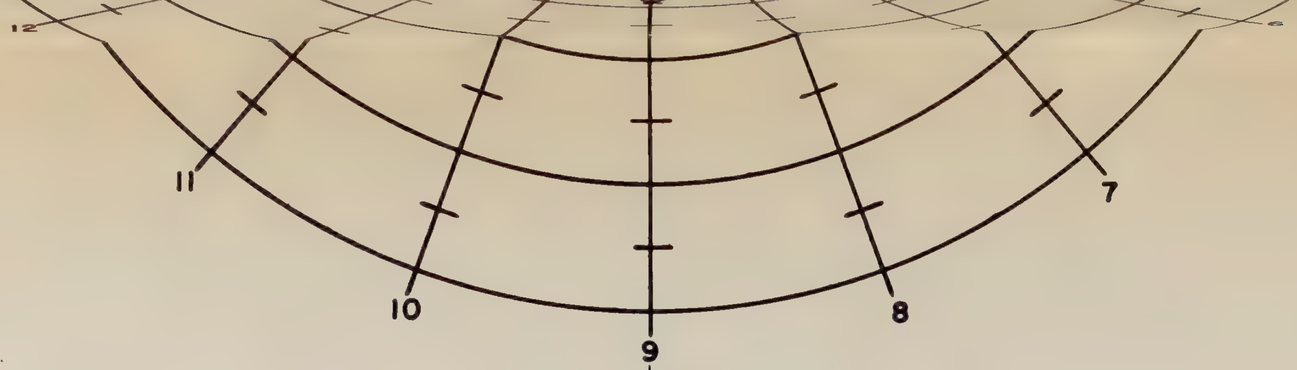
RADIORIENTATION PLOT

POT-B

NO.2 2-SHORT STRING-11 SHOTS GUN NO.3 PERFORATIONS 1196-1206 ONE SHOT PER FOOT





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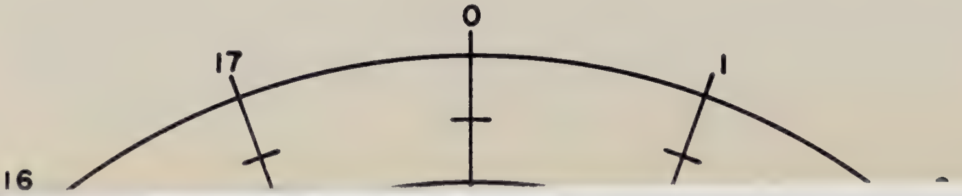
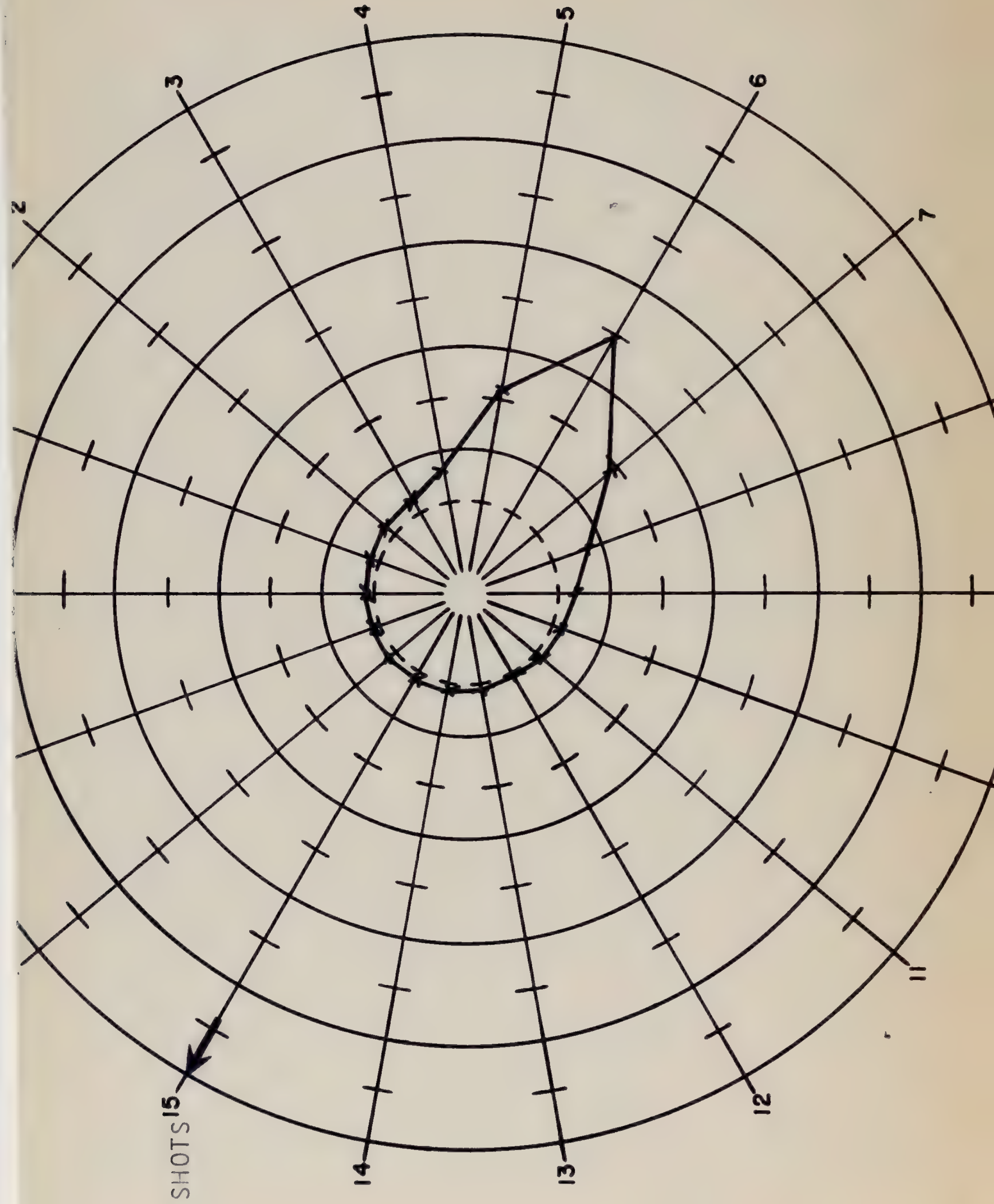
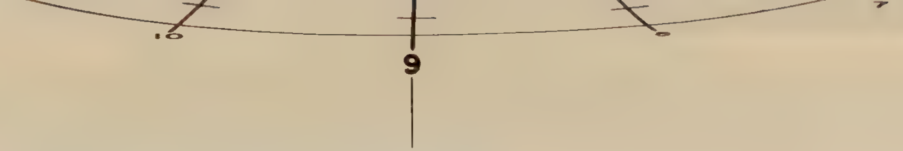
RADIORIENTATION PLOT

POT-B

NO.2-SHORT STRING-11 SHOTS GUN NO.4 PERFORATIONS 1185-1195 ONE SHOT PER FOOT




SHOTS
15
14
13
12
11
7
6
5
4
3
2



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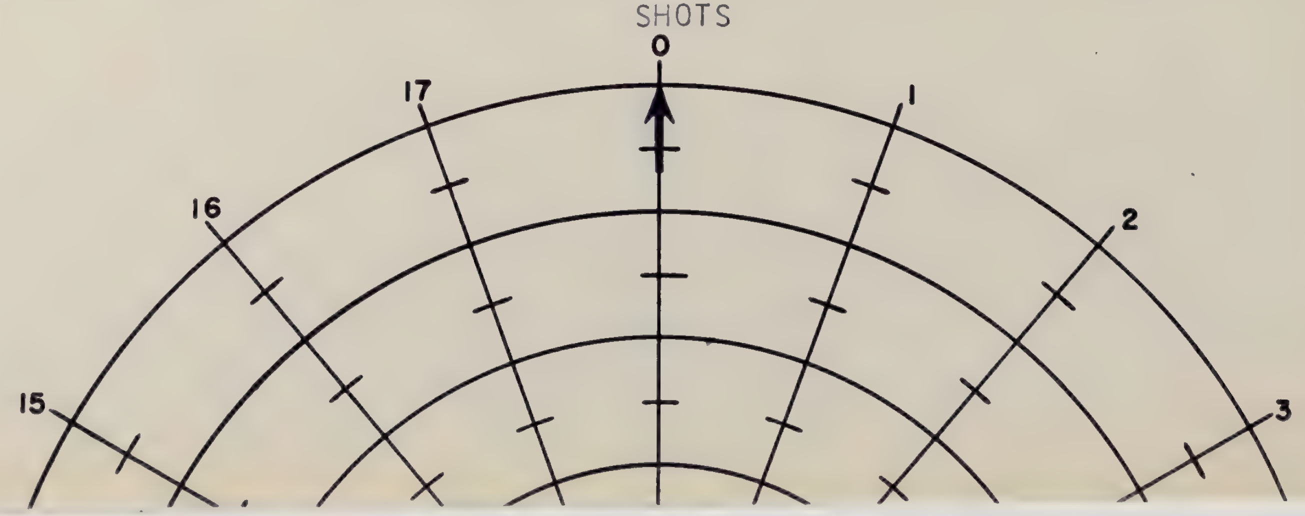
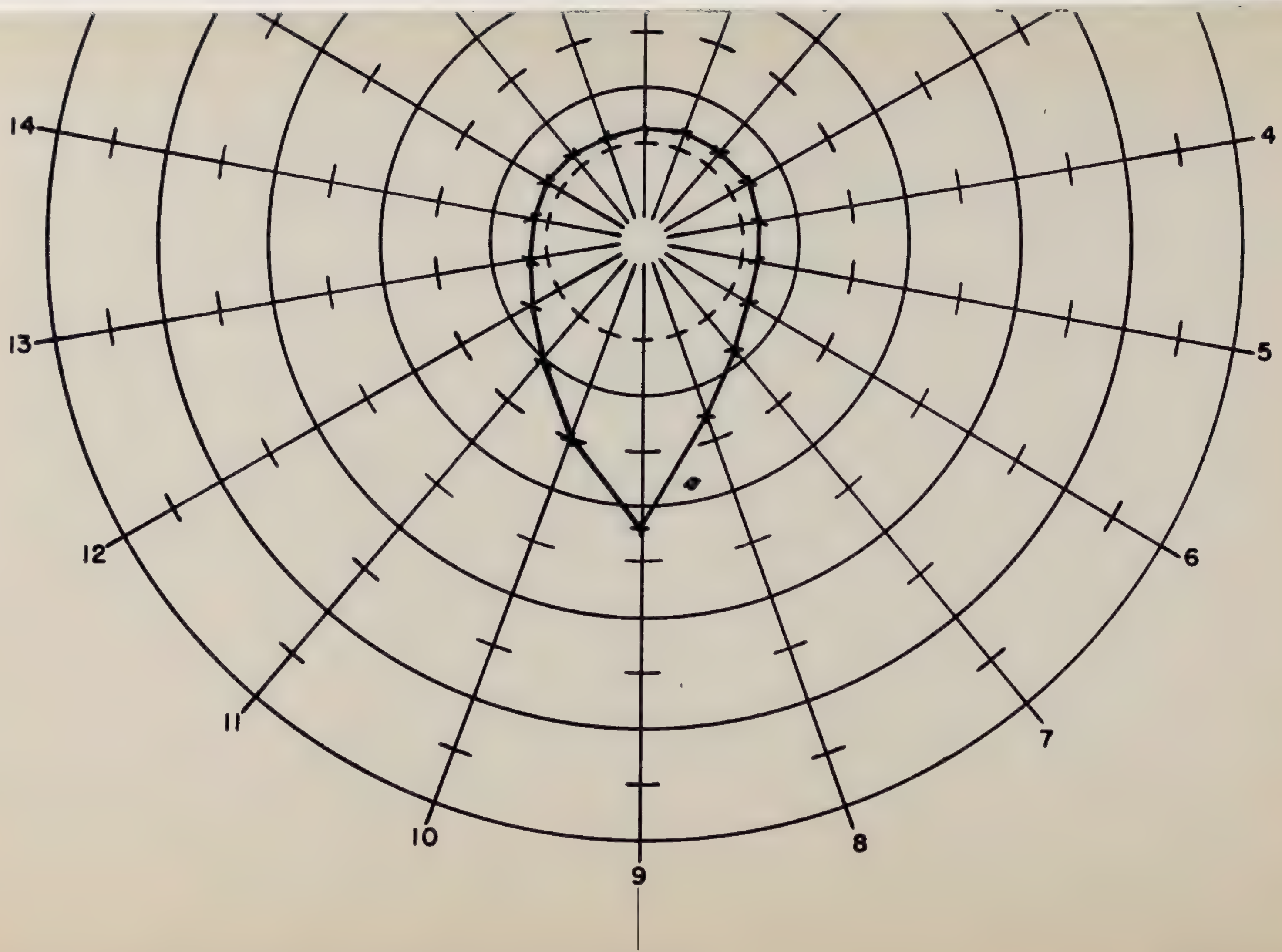
RADIORIENTATION PLOT

POT-B

NO.2-SHORT STRING-11 SHOTS GUN NO.5 PERFORATIONS 1174-1184 ONE SHOT PER FOOT





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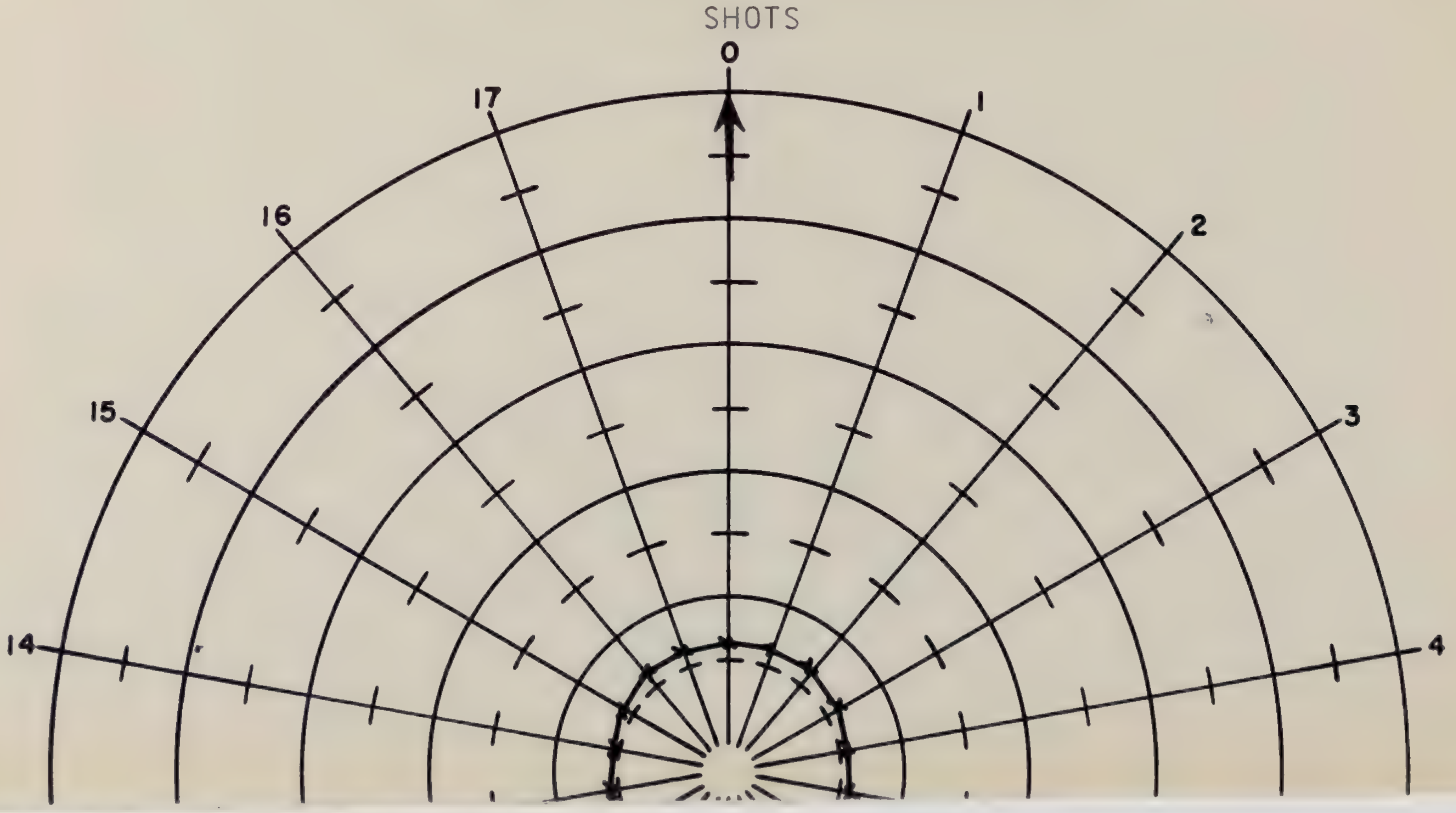
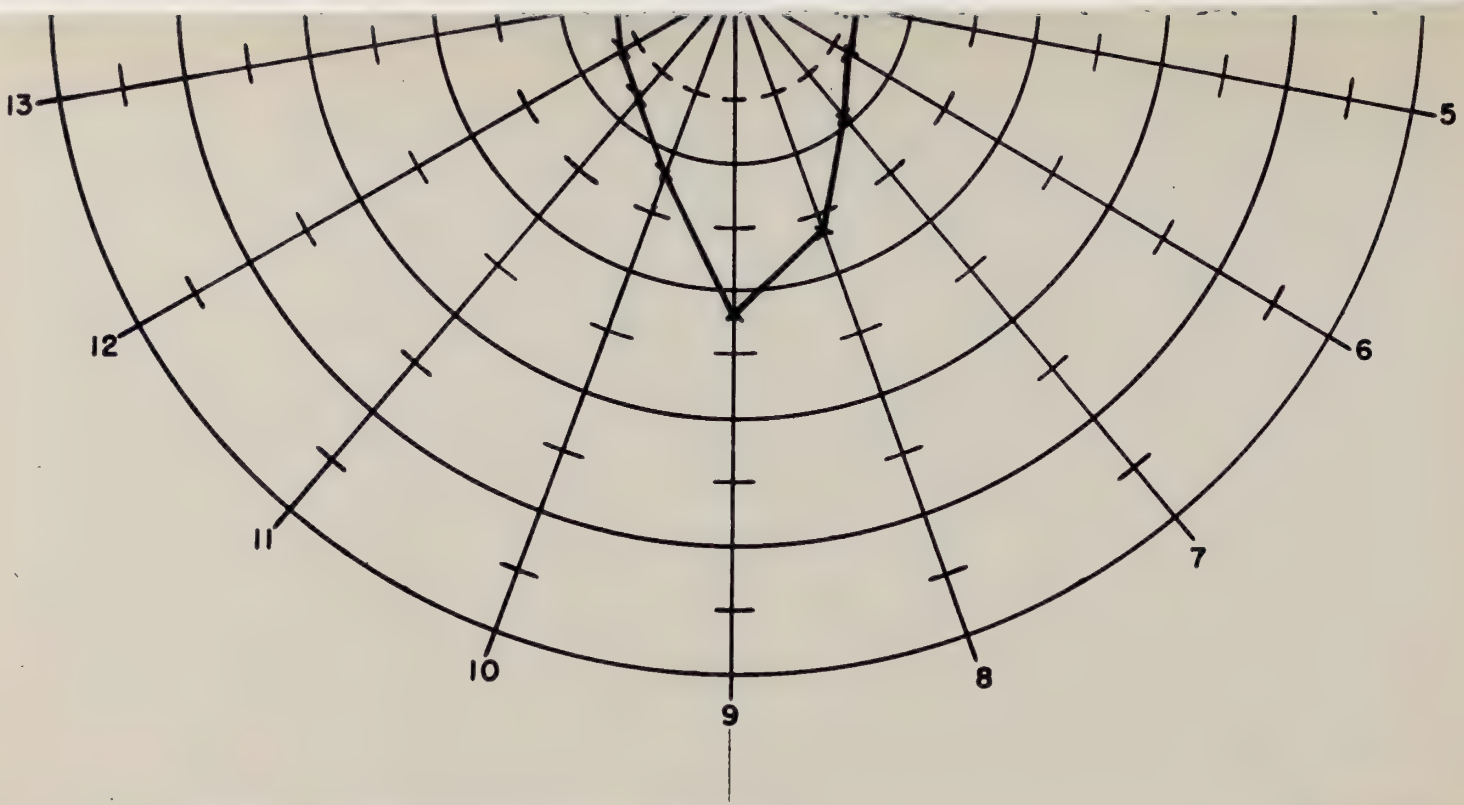
RADIORIENTATION PLOT

POT-B

NO.2-SHORT STRING-11 SHOTS GUN NO.6 PERFORATIONS 1163-1173 ONE SHOT PER FOOT





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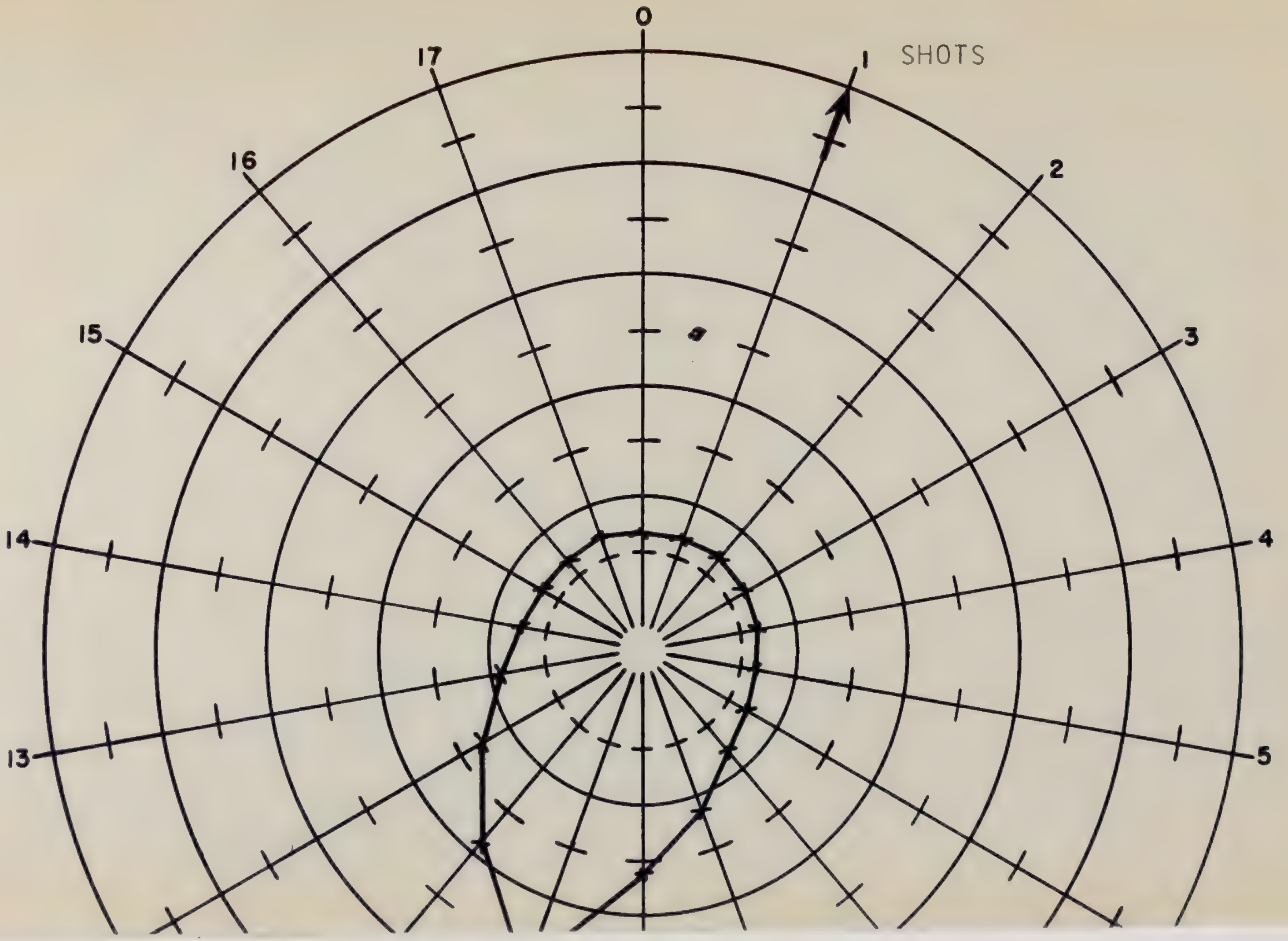
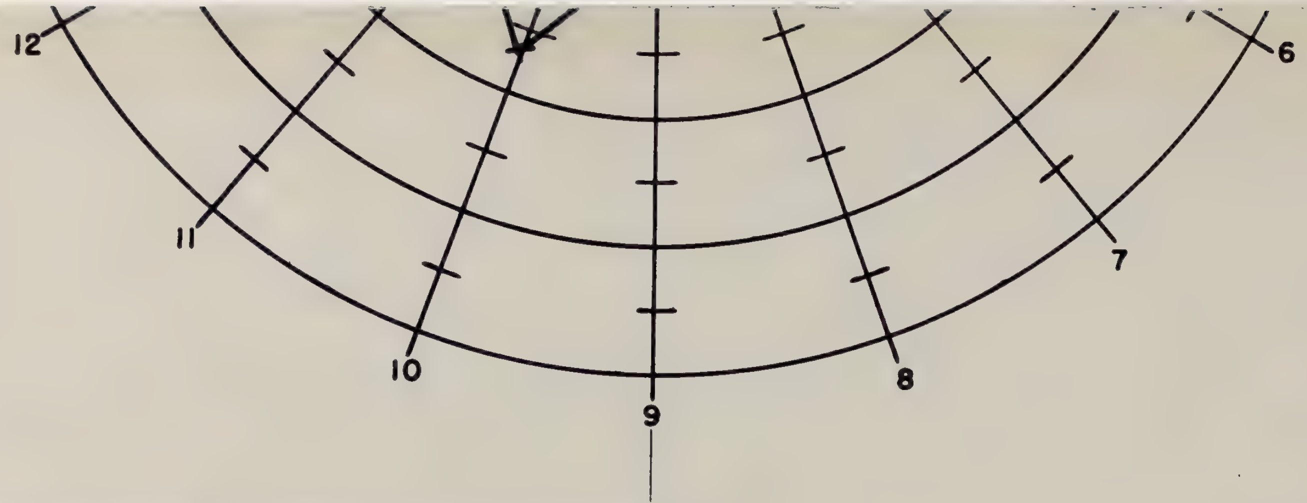
RADIORIENTATION PLOT

POT-B

NO.2-SHORT STRING-11 SHOTS GUN NO.7 PERFORATIONS 1152-1162 ONE SHOT PER FOOT





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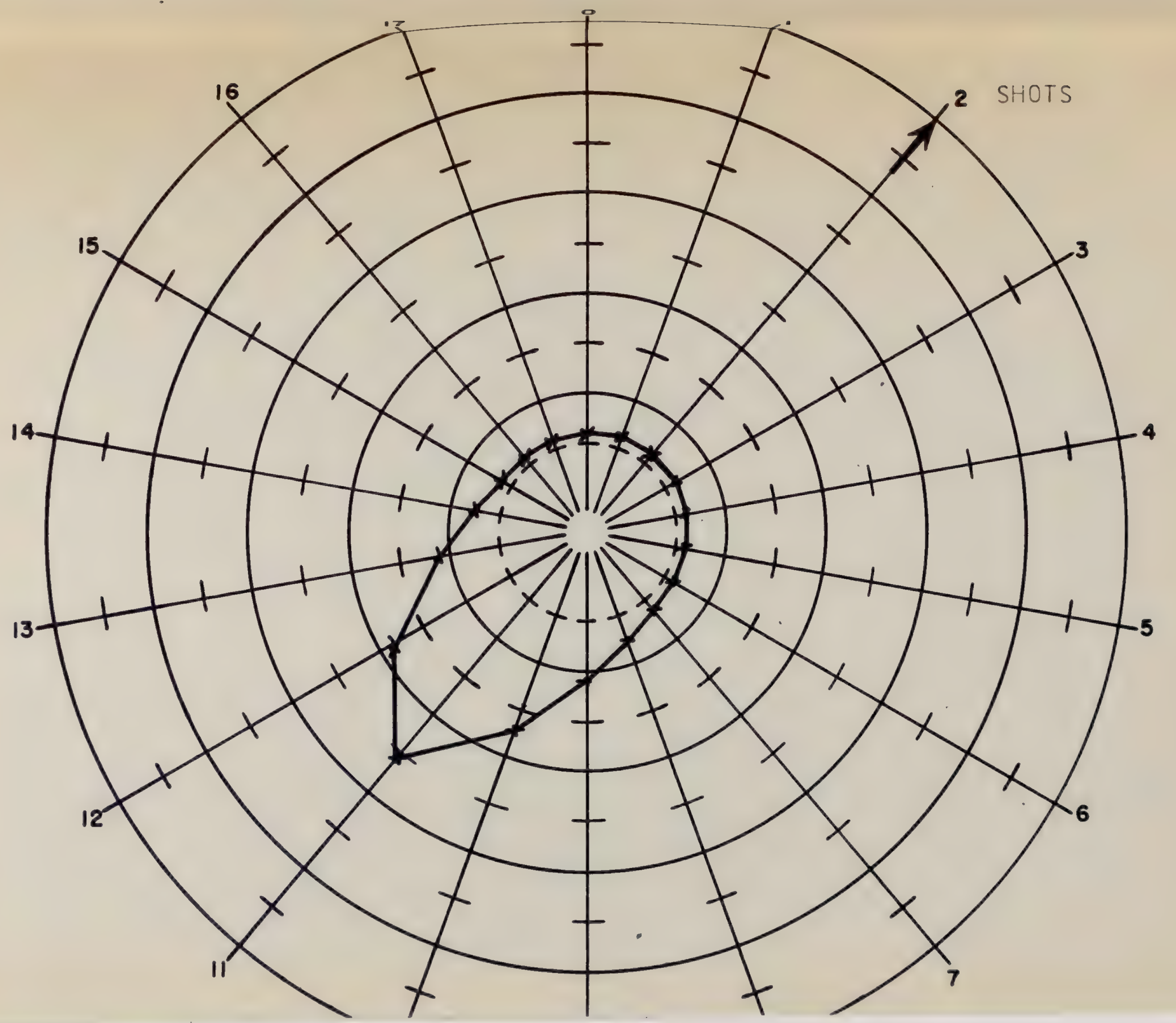
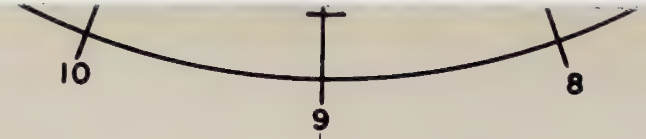
RADIORIENTATION PLOT

POT-B

NO.2-SHORT STRING-11 SHOTS GUN NO. 8 PERFORATIONS 1141-1151 ONE SHOT PER FOOT

0


17
0
1
16
2
SHOTS
15
3
14
4
13
5
12
6
11
7



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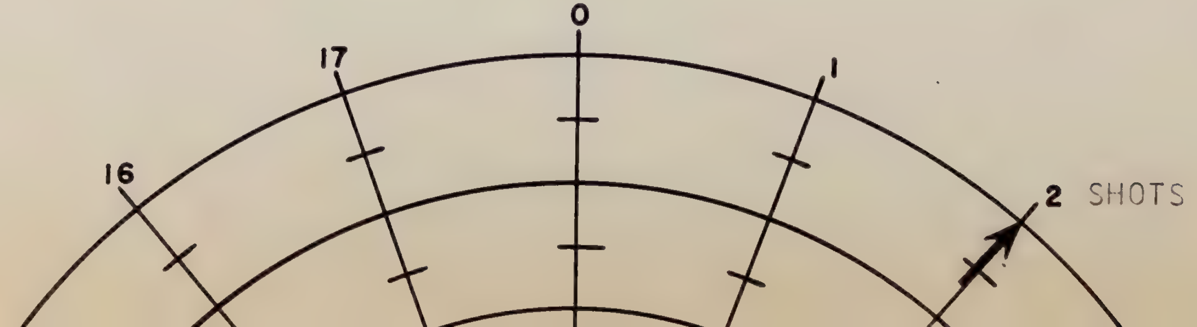
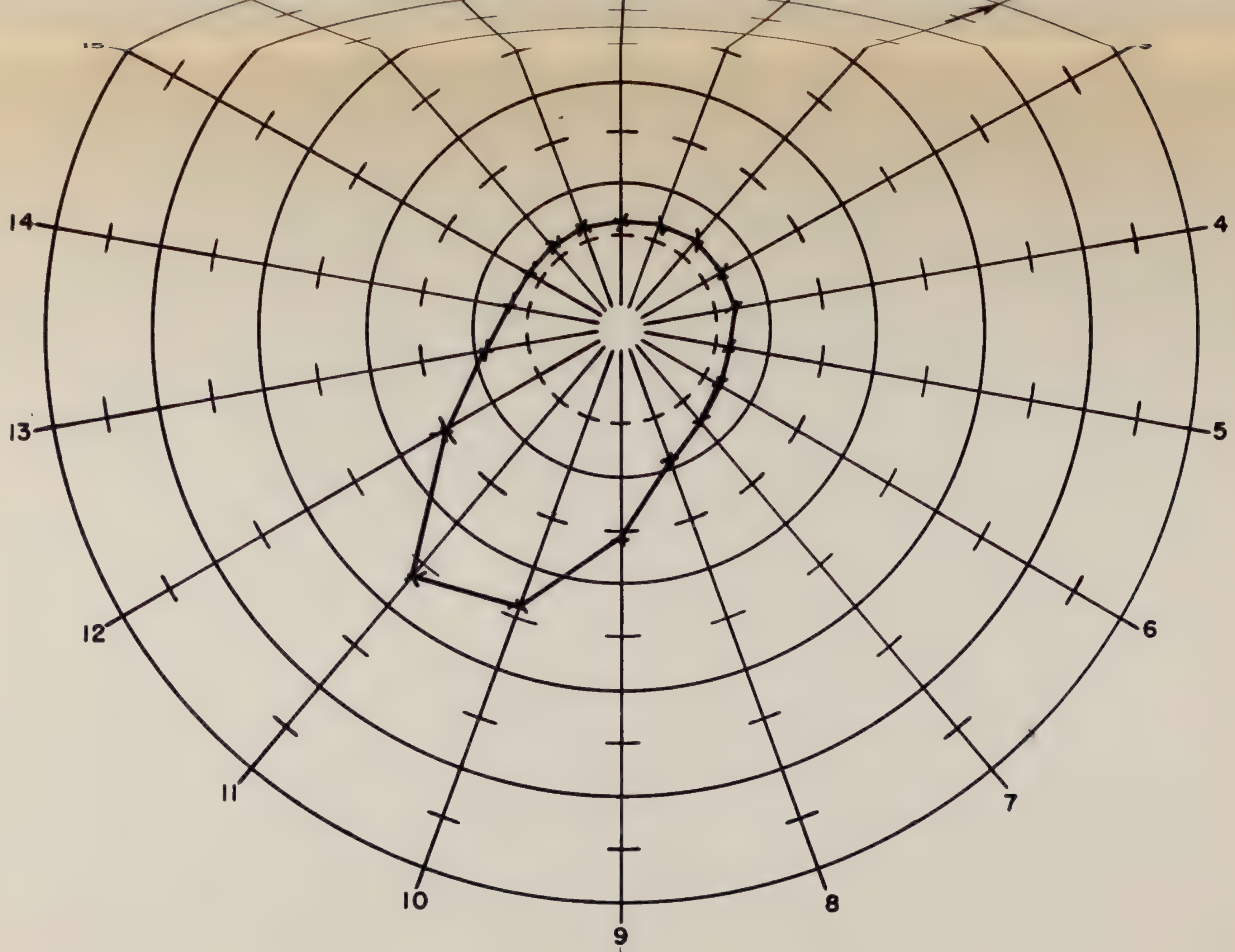
RADIORIENTATION PLOT

POT-B

NO.2-SHORT STRING-11 SHOTS GUN NO.9 PERFORATIONS 1130-1140 ONE SHOT PER FOOT





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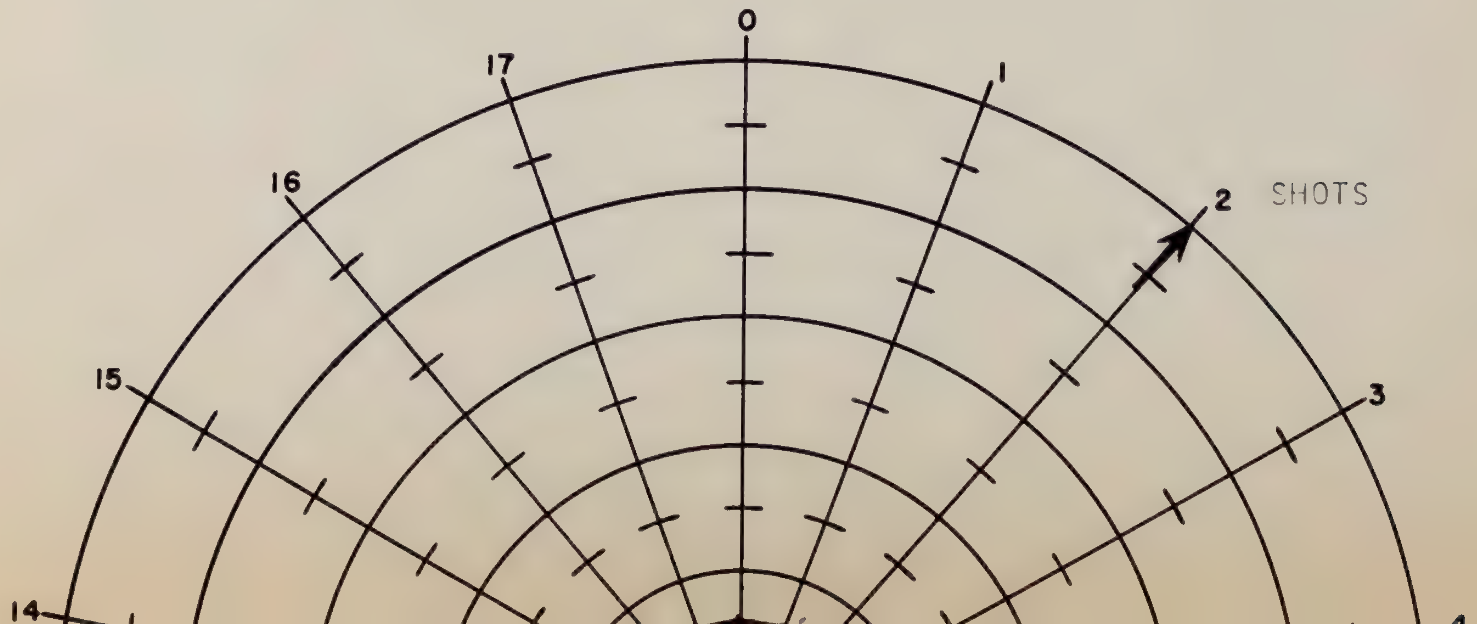
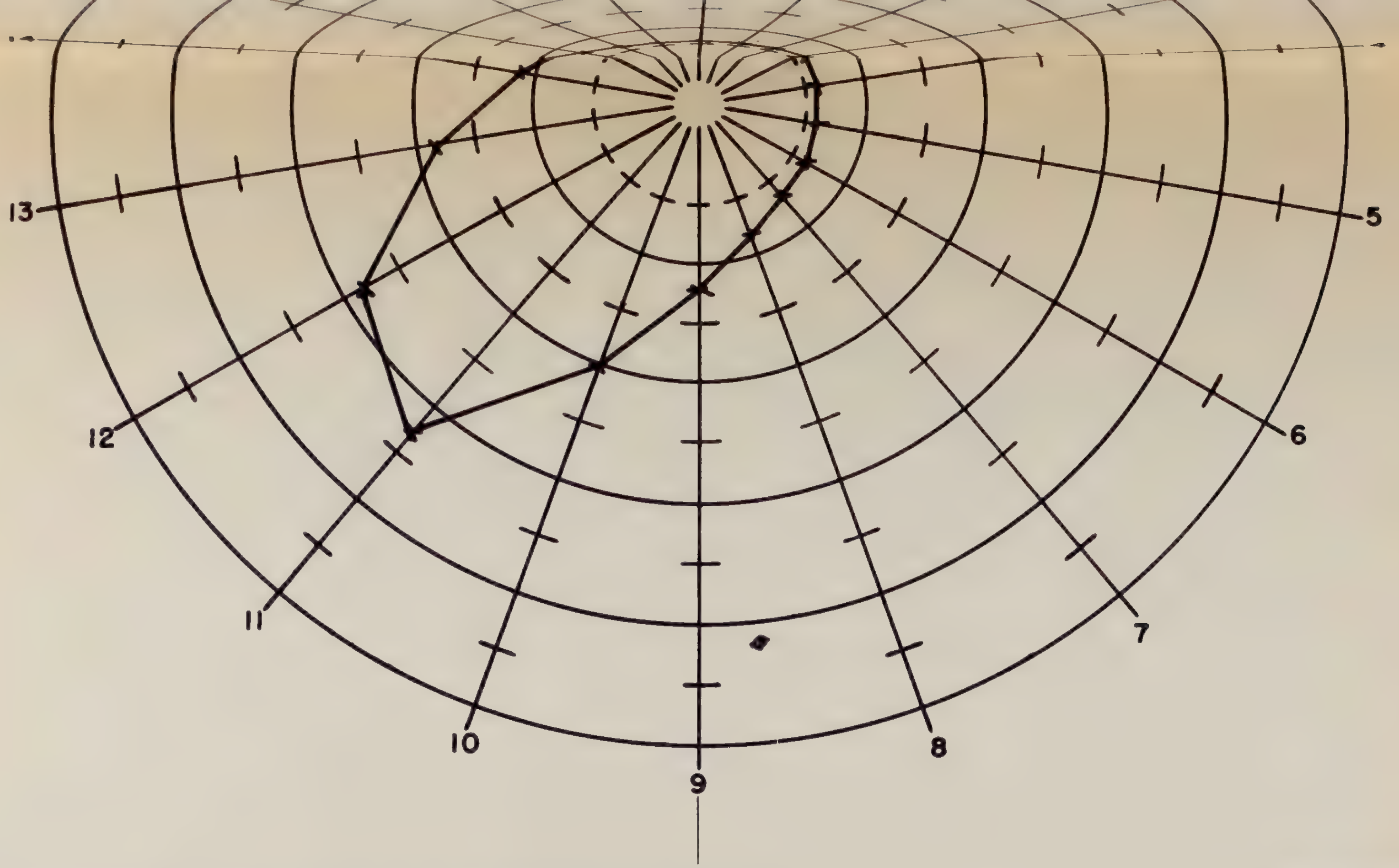
drill hole and other conditions unknown to us.

RADIORIENTATION PLOT

POT-B

NO.2-SHORT STRING-11 SHOTS GUN NO.10 PERFORATIONS 1119-1129 ONE SHOT PER FOOT





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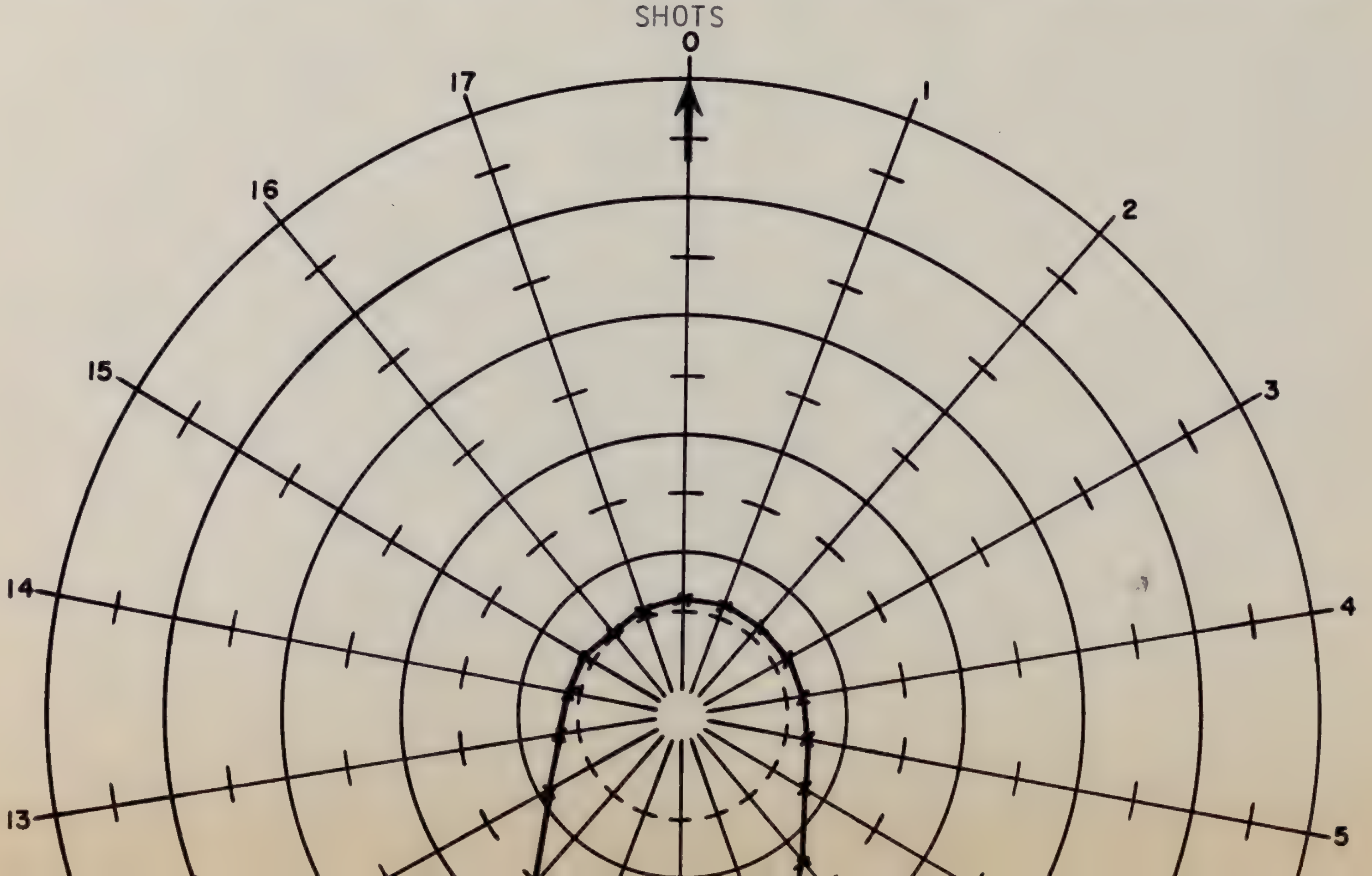
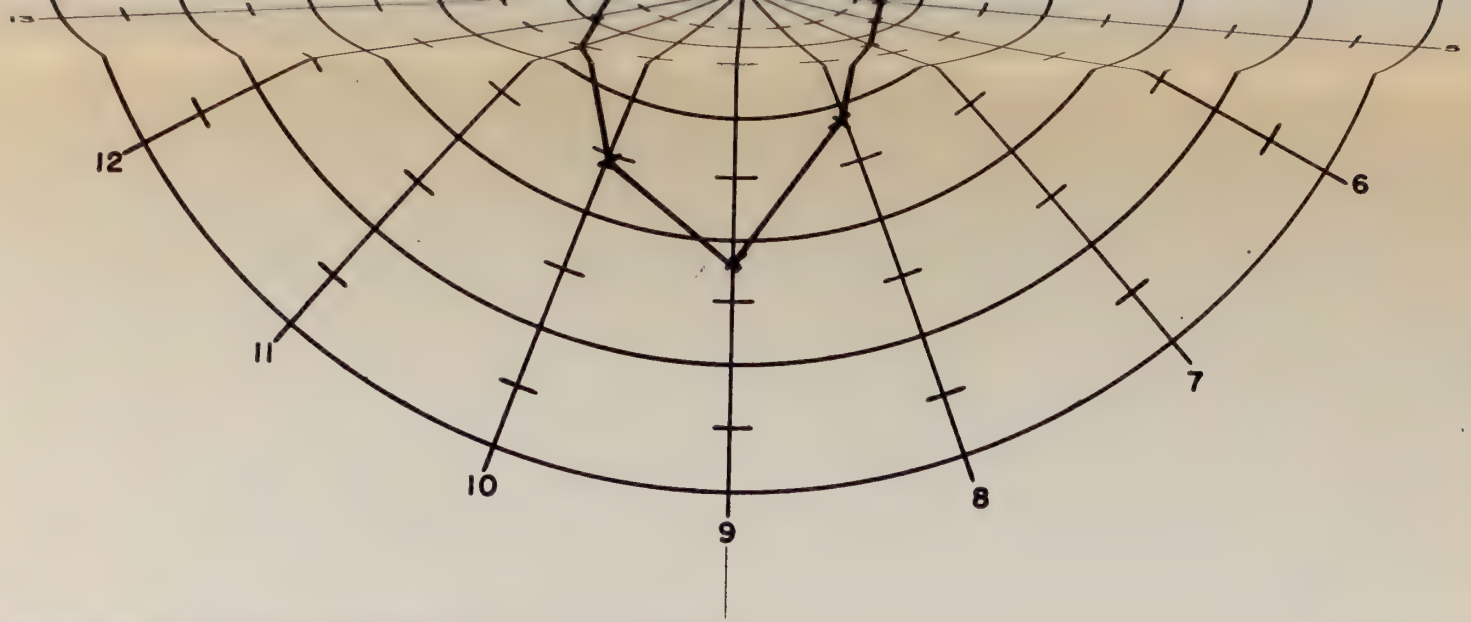
RADIORIENTATION PLOT

POT-B

NO.2-SHORT STRING-11 SHOTS GUN NO. 11 PERFORATIONS 1108-1118 ONE SHOT PER FOOT





This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by vagrant metal in the drill hole and other conditions unknown to us.

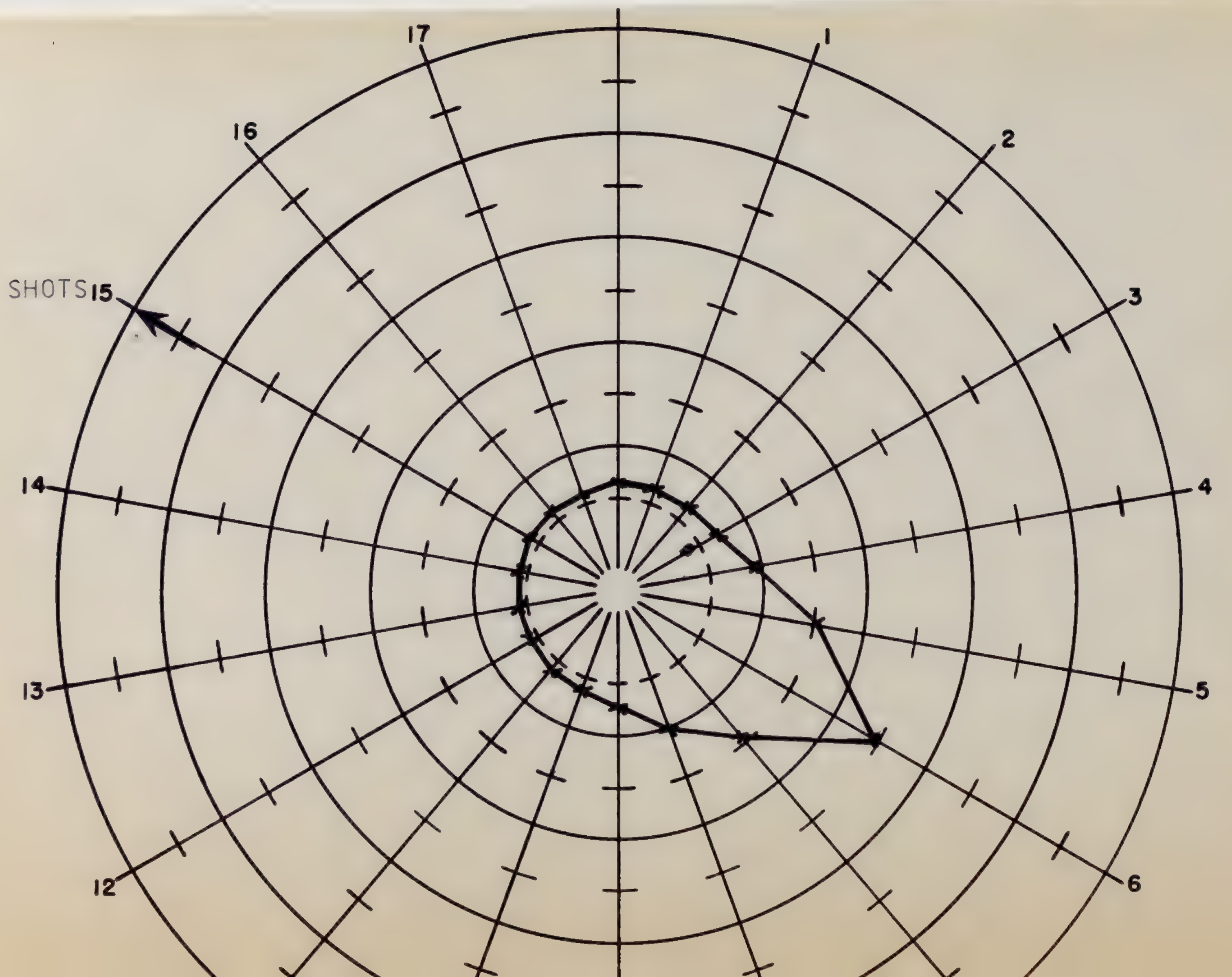
Schlumberger

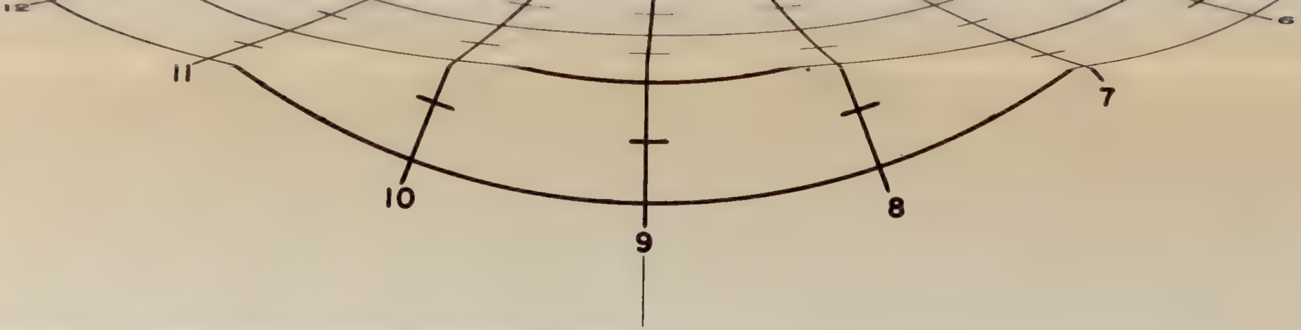
RADIORIENTATION PLOT

POT-B

NO.2-SHORT STRING-11 SHOTS GUN NO.12 PERFORATIONS 1097-1107 ONE SHOT PER FOOT

0


SHOTS



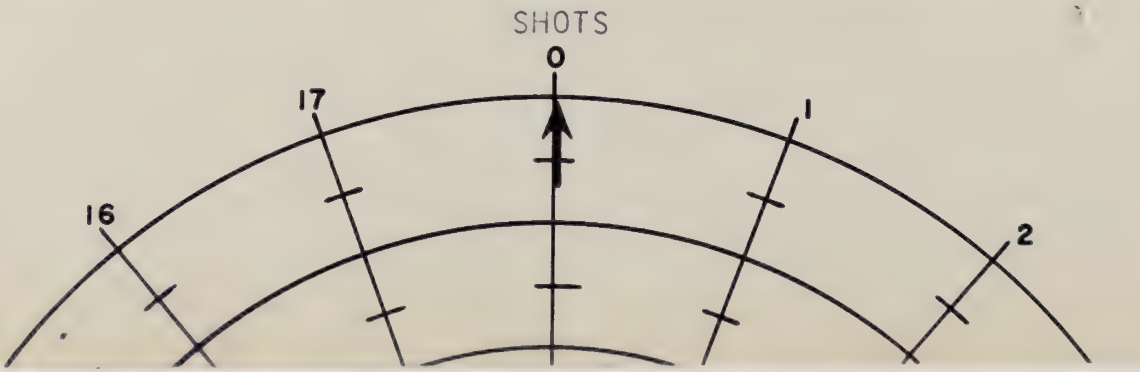
This chart, computation and/or interpretation of our readings from our gamma-gamma orientation and detecting instrument is presented to you in accordance with, but subject to, the General Terms and Conditions as are set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by vagrant metal in the drill hole and other conditions unknown to us.

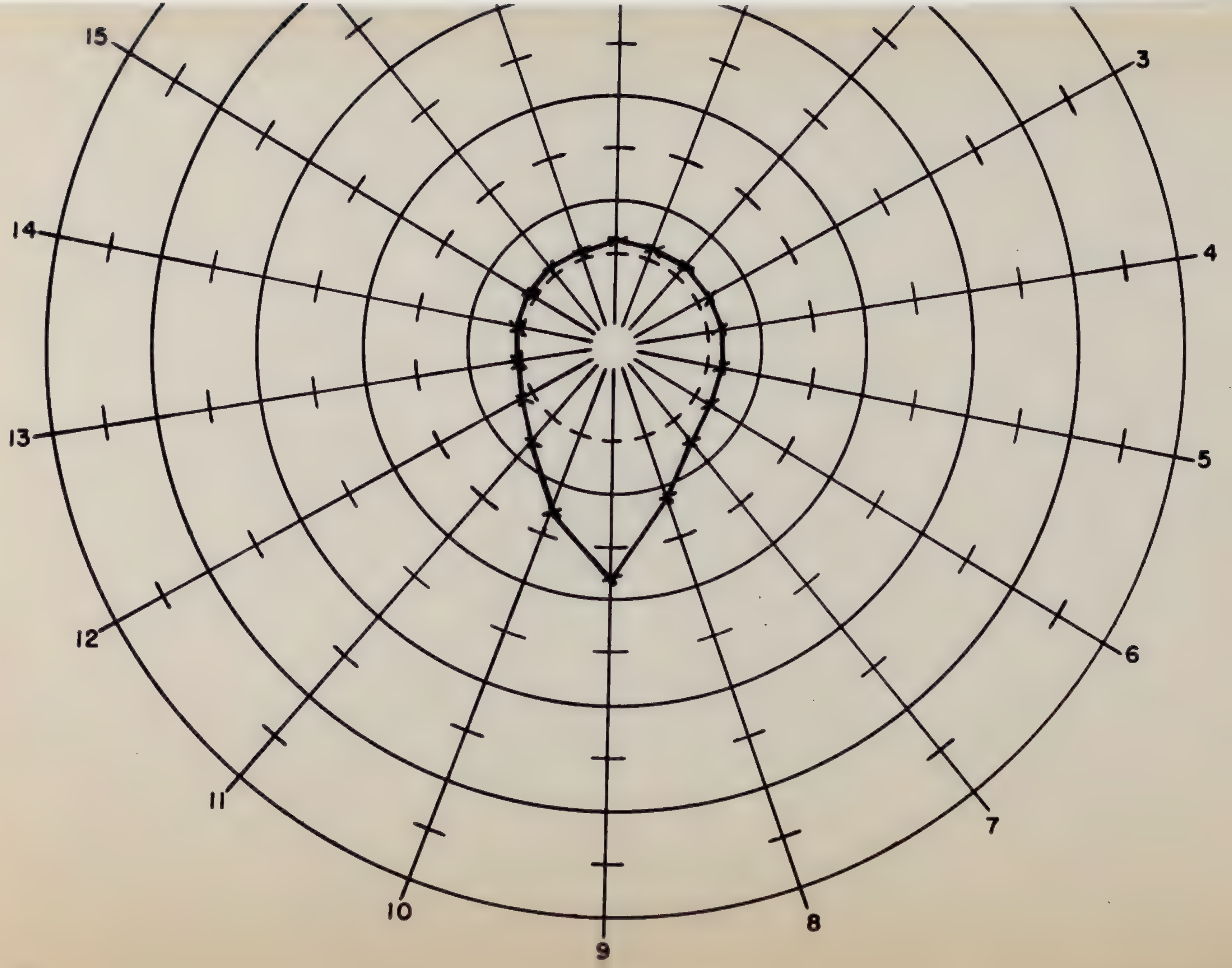
Schlumberger

RADIORIENTATION PLOT

POT-B

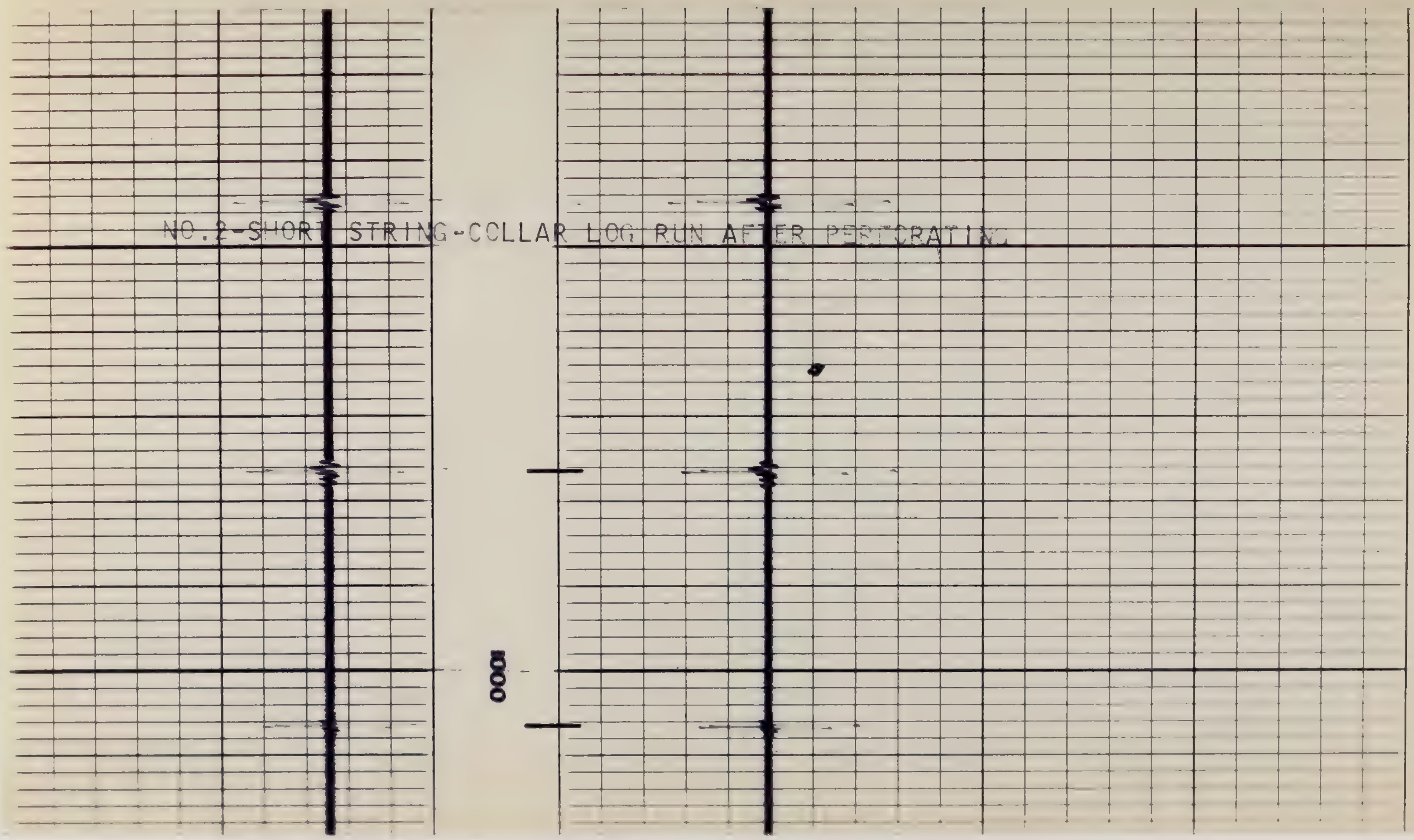
NO.2-SHORT STRING-9 SHOTS GUN NO.13 PERFORATIONS 1088-1096 ONE SHOT PER FOOT

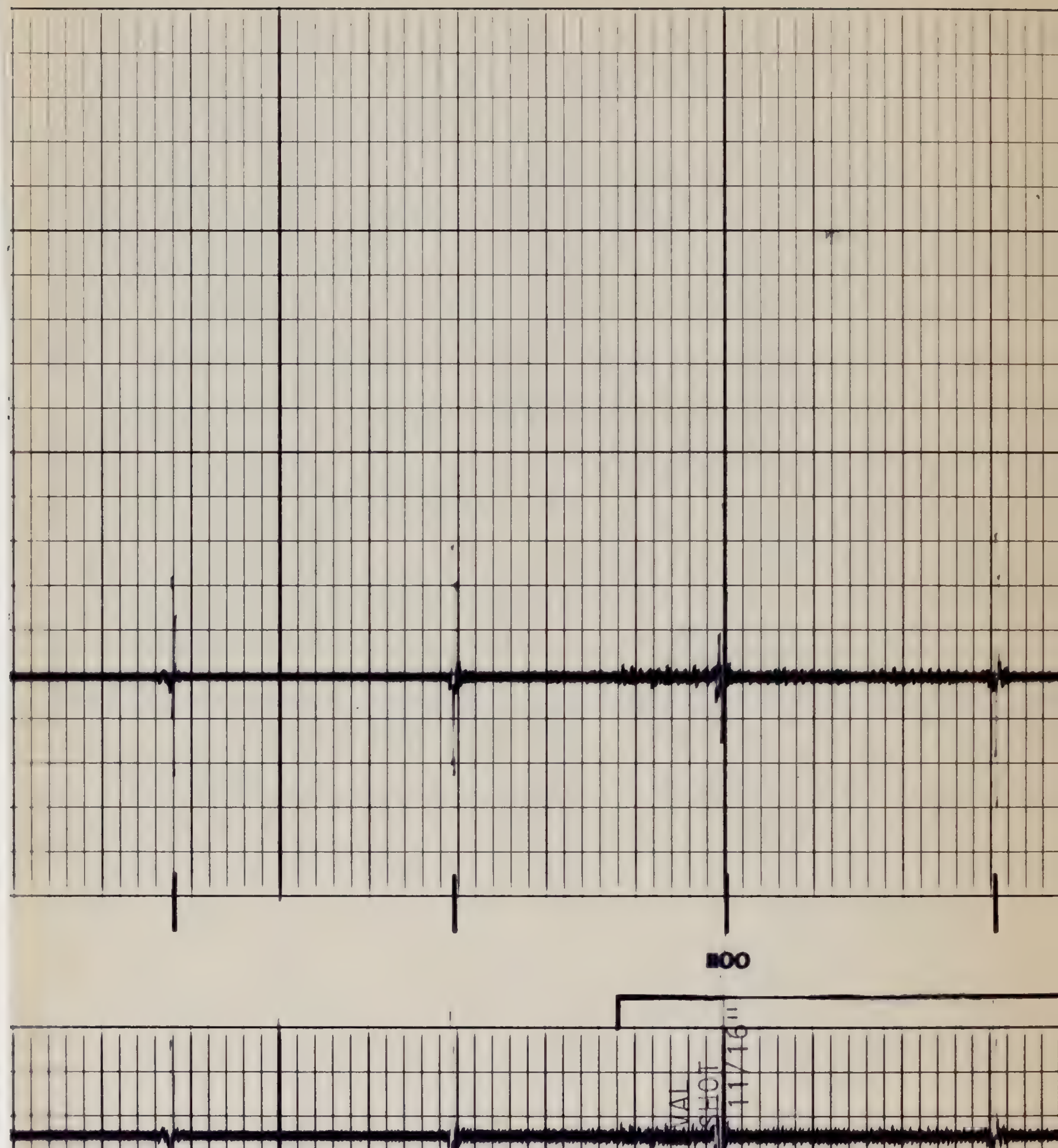


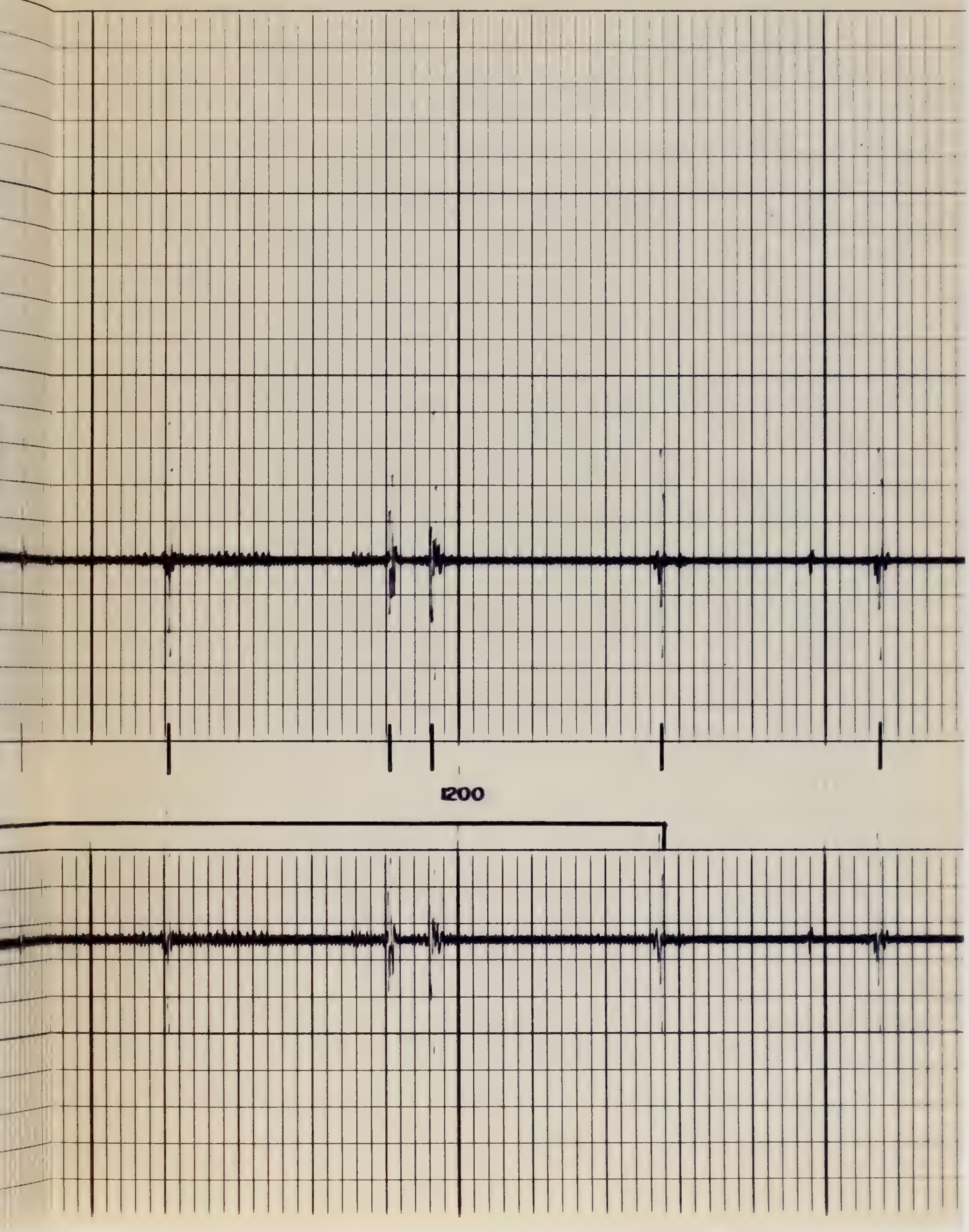

15
3
14
4
13
5
12
6
11
7
10
8
9

[illegible] presented to you in accordance with, but subject to, the General Terms and Conditions as set out on pages 1 and 2 of our current Price Schedule and which are as set out on the reverse side of our Service Order for this job. The readings could be adversely affected by vagrant metal in the drill hole and other conditions unknown to us

Schlumberger




800
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH 11/16"
HYPERDOME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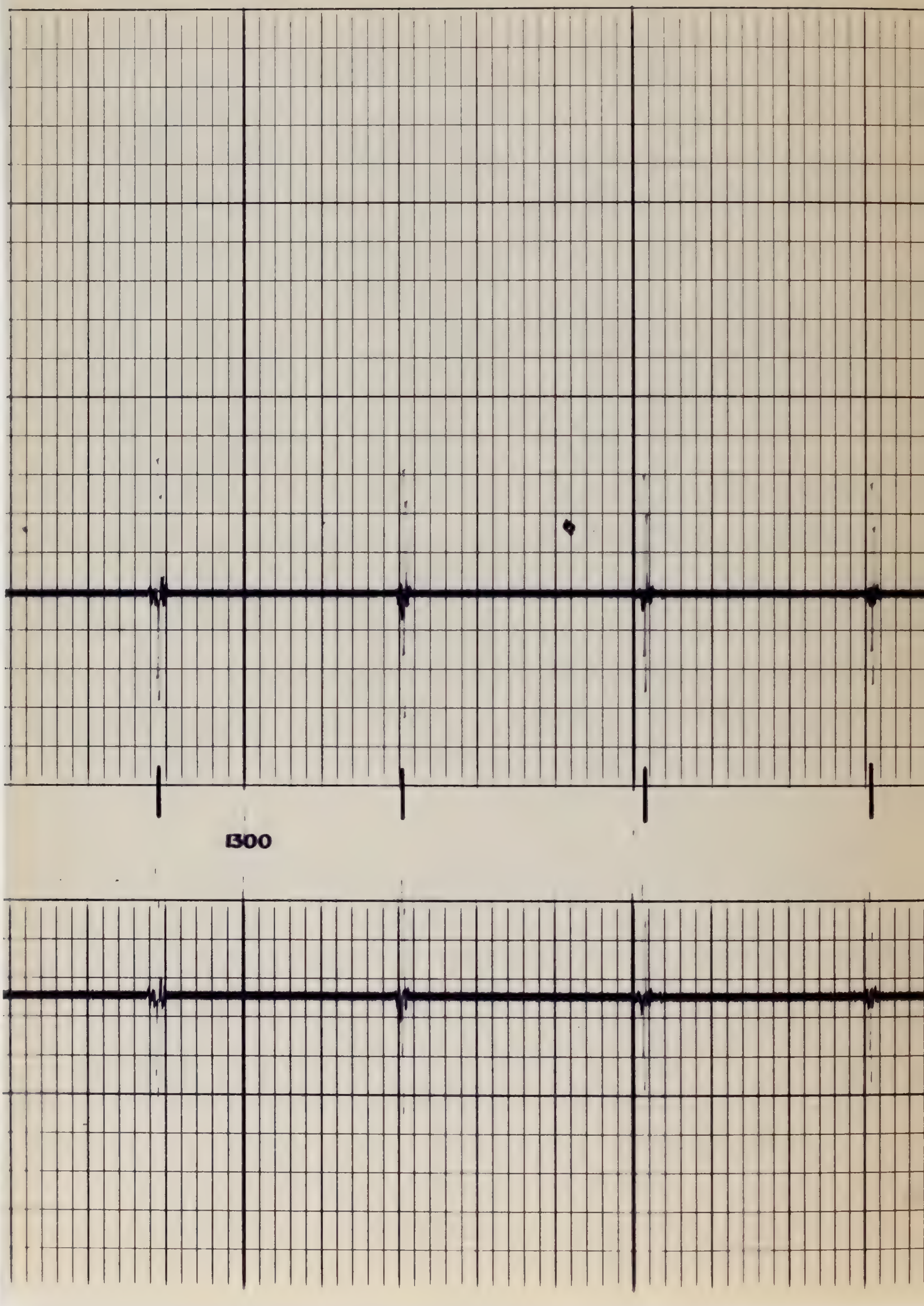
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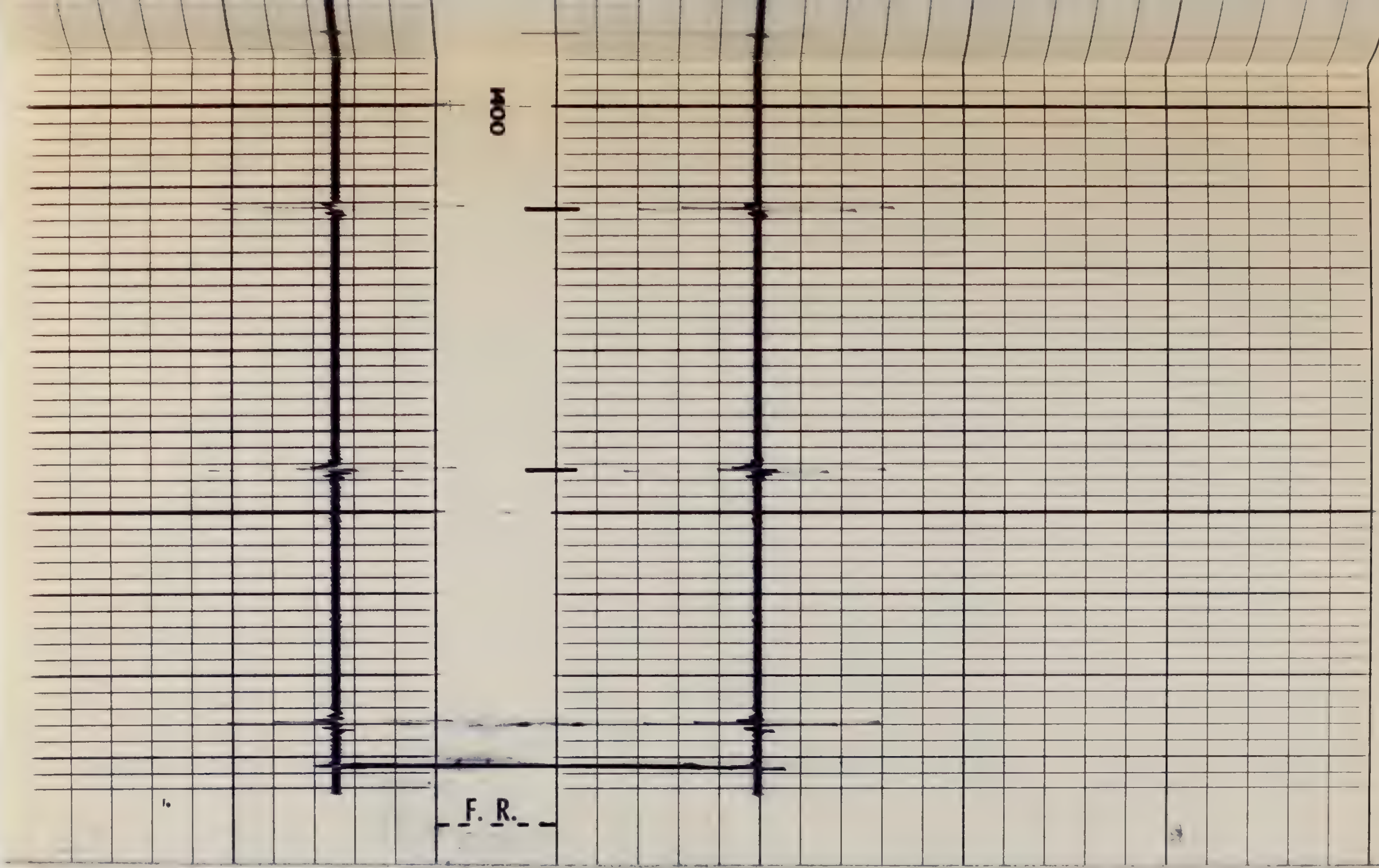


COMPANY ATLANTIC RICHFIELD COMPANY
WELL S.G.NO. 17
FIELD SORGHUM GULCH

Schlumberger

RIO BLANCO, COLORADO

SWS-1425-B

Schlumberger

PERFORATING DEPTH CONTROL

COUNTY RIO BLANCO
FIELD or LOCATION SORGHUM GULCH
WELL S.G. NO.17
COMPANY ATLANTIC RICHFIELD COMPANY

COMPANY ATLANTIC RICHFIELD COMPANY

WELL S.G. NO.17

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

Location
436' FWL & 181 FSL
Sec. 16 Twp. 3S Rge. 46W

Other Services:
CBL-VDL
ORP-HD

Permanent Datum: GROUND LEVEL ; Elev.: 7036
Log Measured From GL , 0 Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B. ----
D.F. ----
G.L. 7036

Date	2-15-75		
Run No.	ONE		
Type Log	GAMMA RAY		
Depth — Driller	2305-1490		
Depth — Logger	2285-1503		
Bottom logged interval	2277-1495		
Top logged interval	900- 800		
Type fluid in hole	WATER		
Salinity, PPM Cl.	----		
Density	----		
Level	FULL		
Max. rec. temp., deg F.	----		
Operating rig time	THREE HOURS		
Recorded By	ST. AUBYN		
Witnessed By	MR. DON TAIT		

BORE-HOLE RECORD			CASING RECORD			
Bit Size	From	To	Size	Wgt.	From	To
6 3/4	56	2460	8 5/8	24	SURF	63
			2 3/8	4.7	SURF	2335
			2 3/8	4.7	SURF	1490

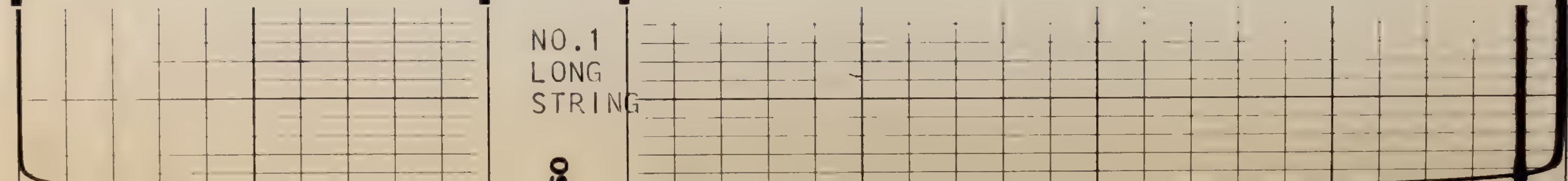
FOLD HERE The well name, location and borehole reference data were furnished by the customer.

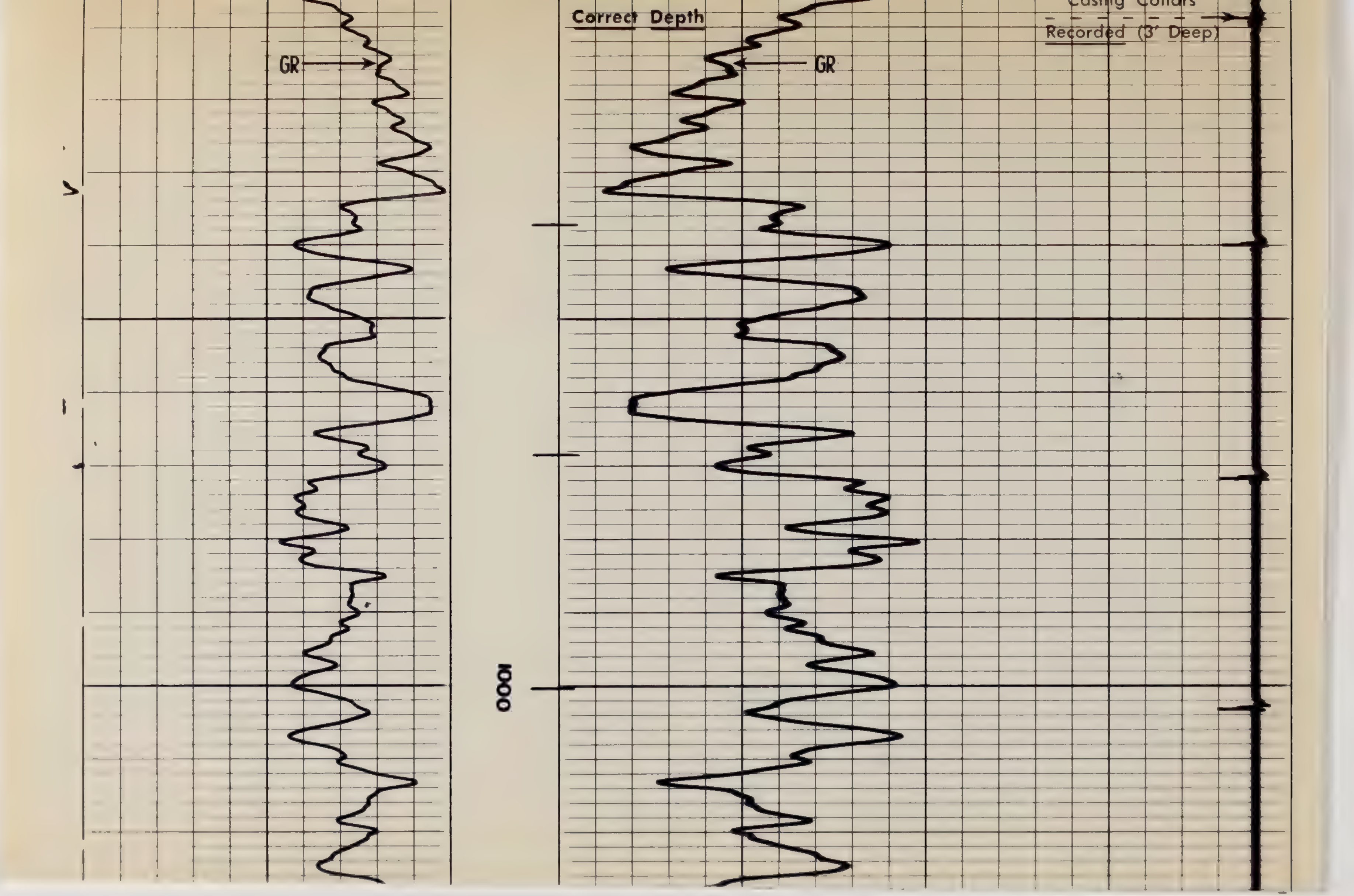
EQUIPMENT DATA

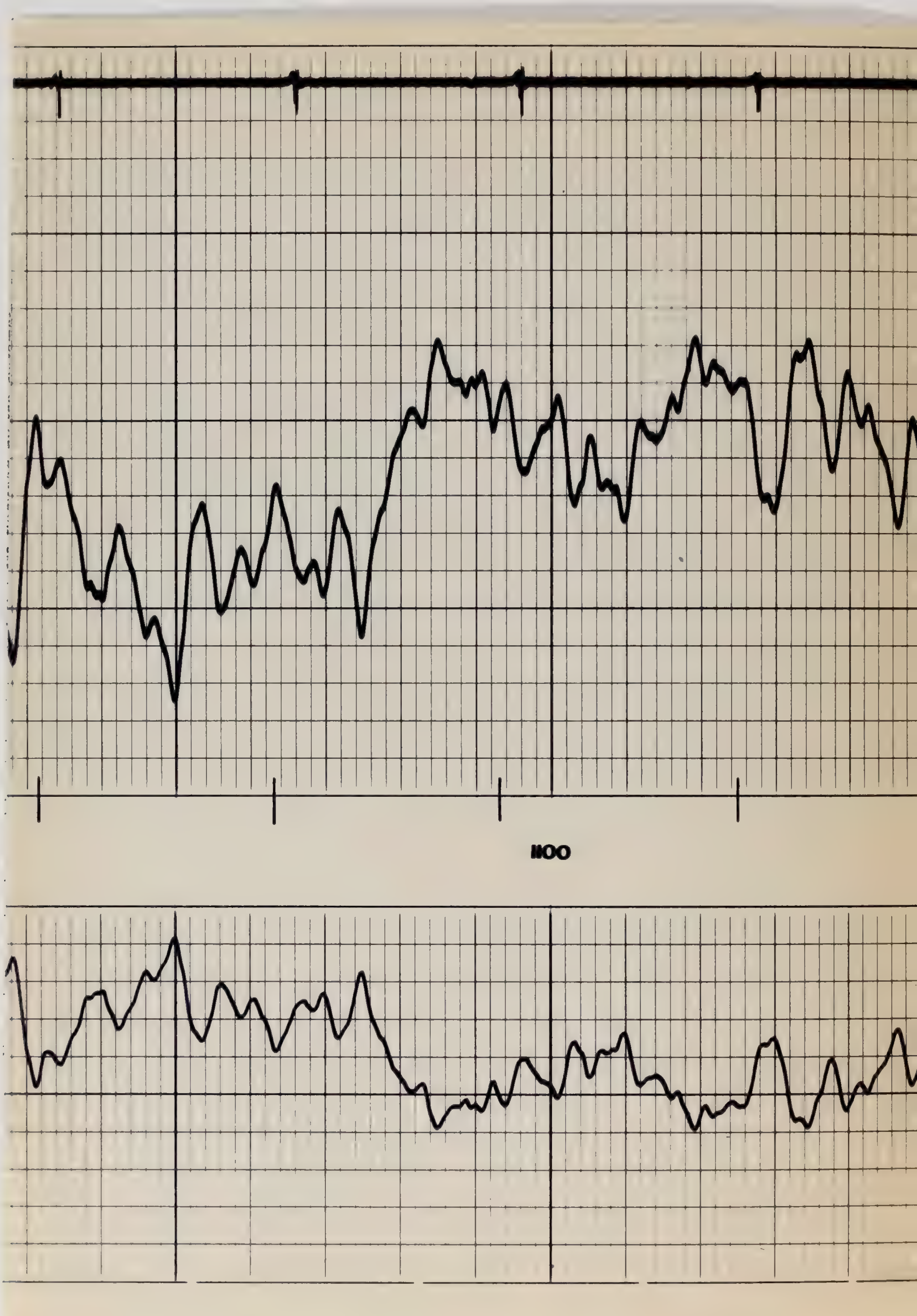
Gamma Ray		
Run No.	ONE	
Tool Model No.	GNT-K	
Diameter	1 11/16"	
Det'r Model No.	SGD-H	
Type	SCINT	
Length	8"	
S. O. No.		
General		
Hoist Truck No.	3862	
Inst. Truck No.	3862	
Tool Serial No.	291	
Location	VERNAL	

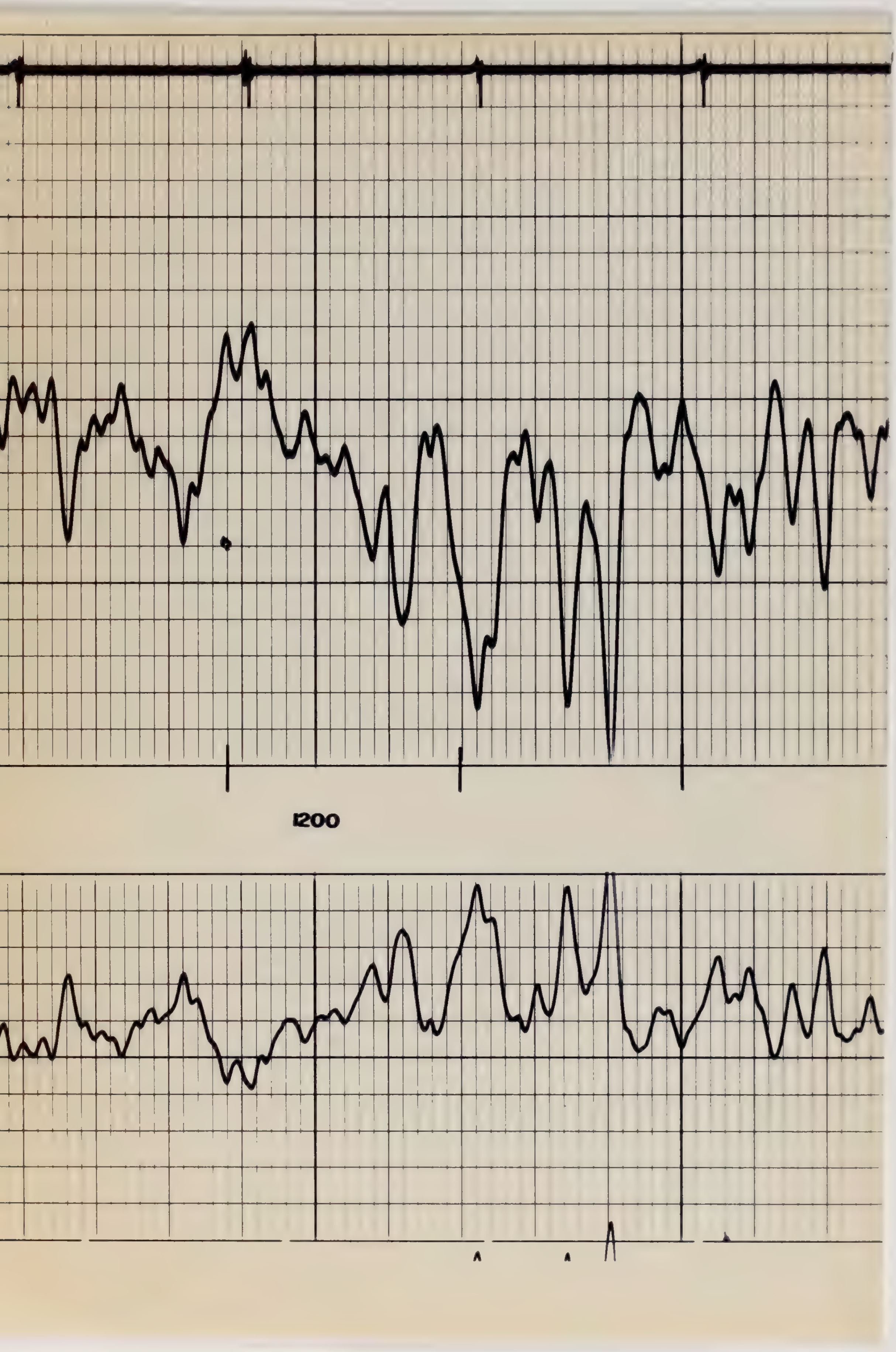
Remarks: Casing Collars recorded 3 ft. DEEP . Corrected collar depths are shown in the depth track.

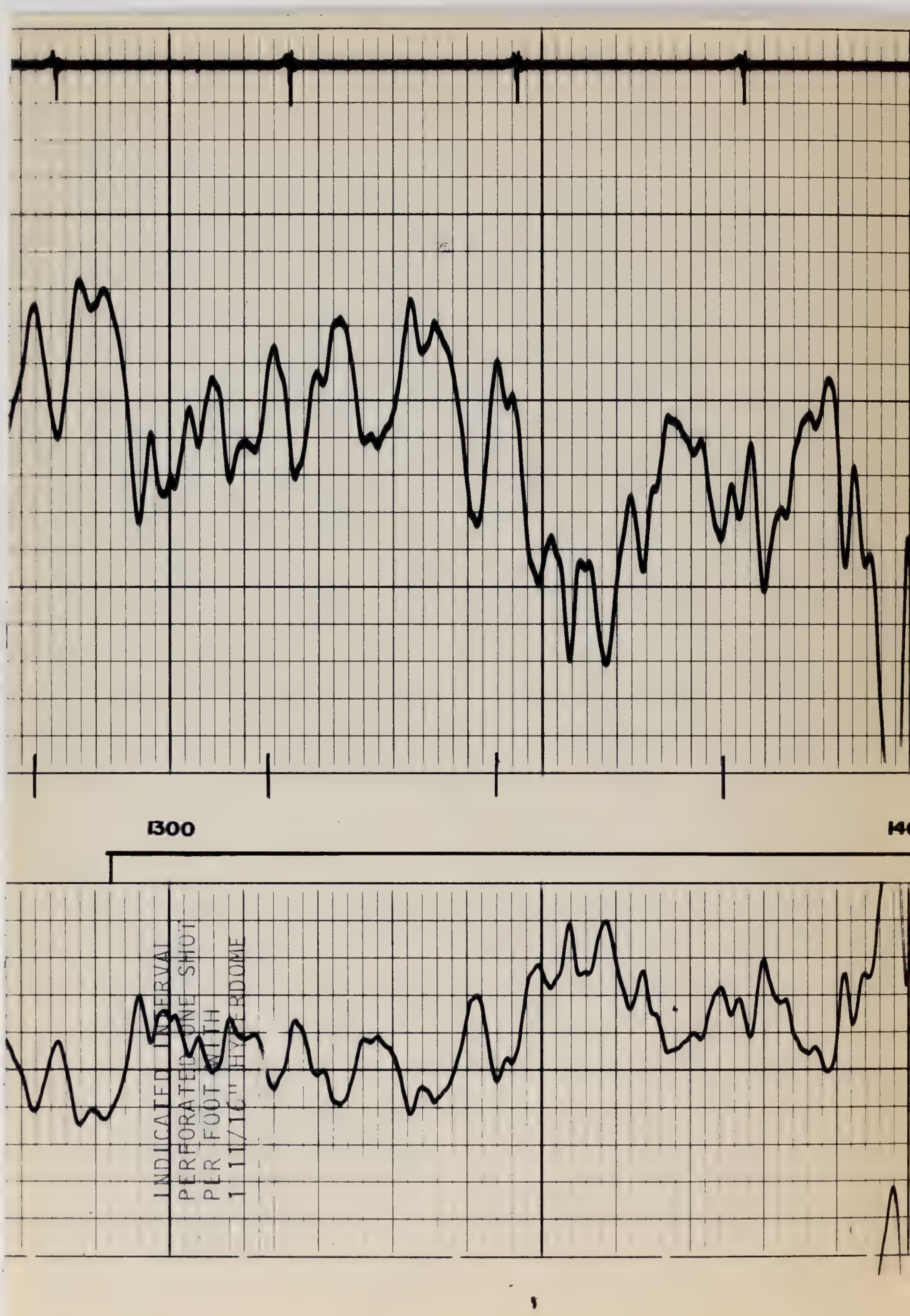
GAMMA RAY RADIOACTIVITY INCREASES →	DEPTHS	GAMMA RAY ← RADIOACTIVITY INCREASES
		Casing Collars Correct Depth ↓ / Recorded Casing Collars ↓

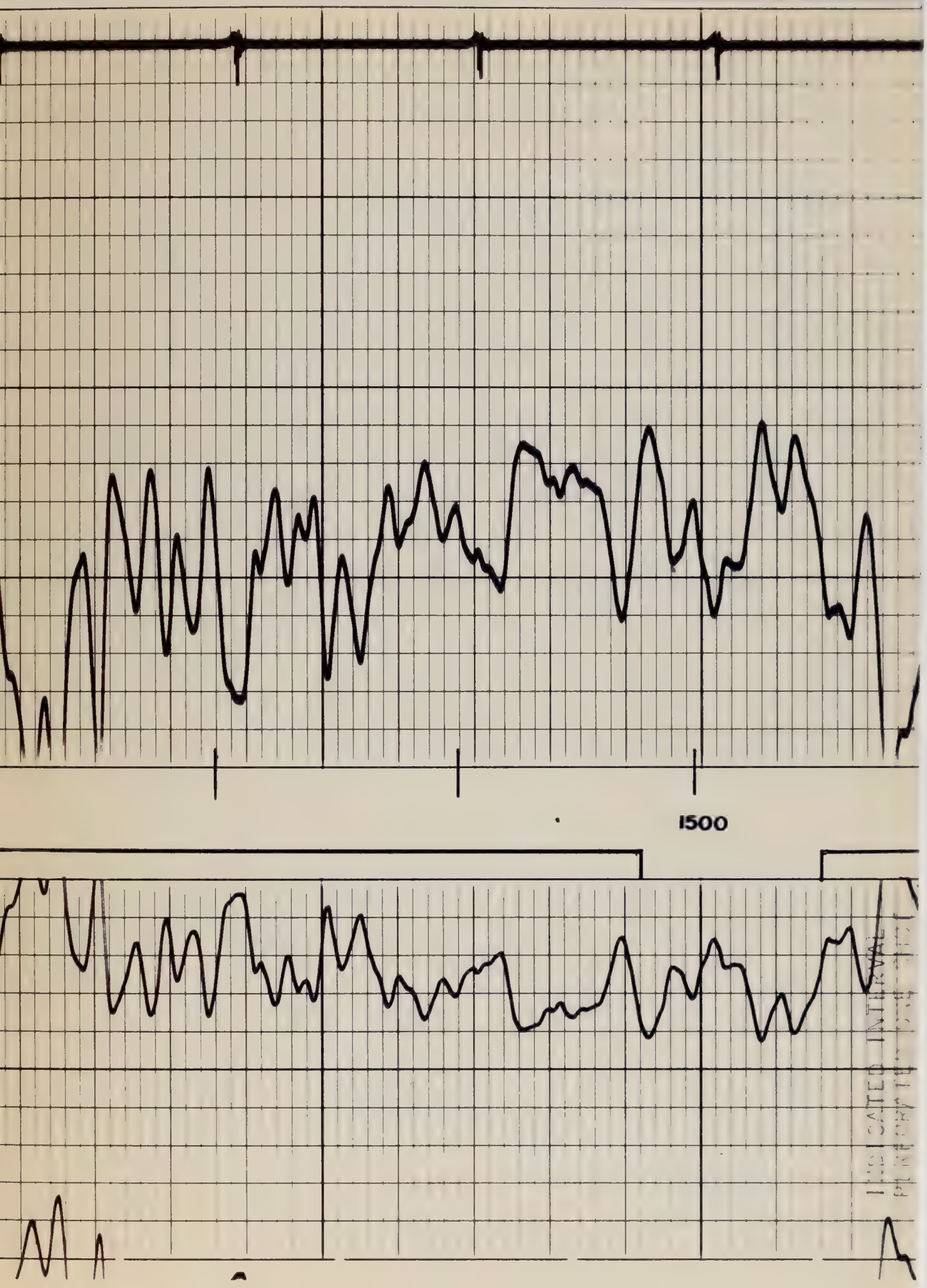


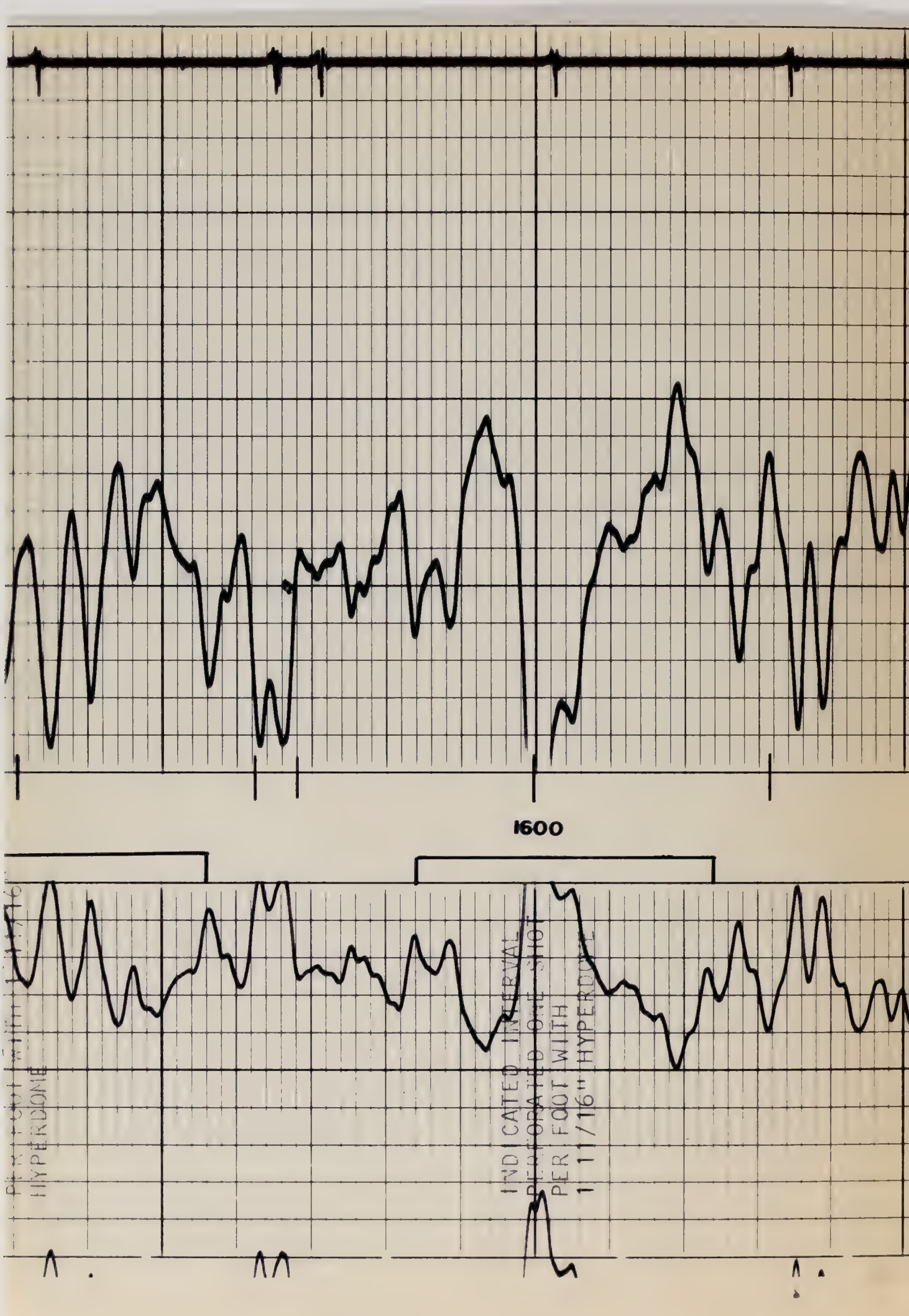

Casing Collars
Recorded (3' Deep)
Correct Depth
GR
GR
1000

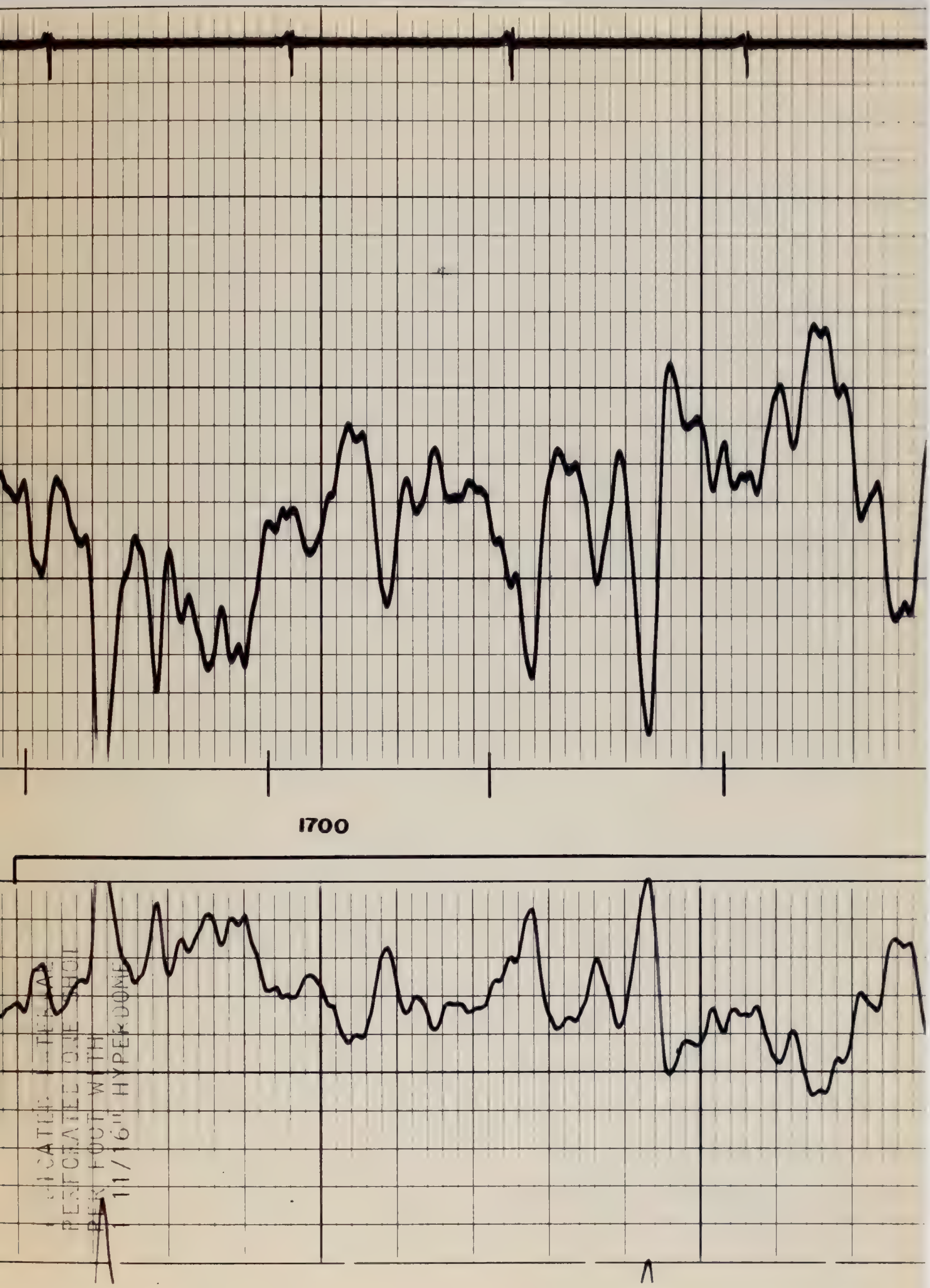

1100

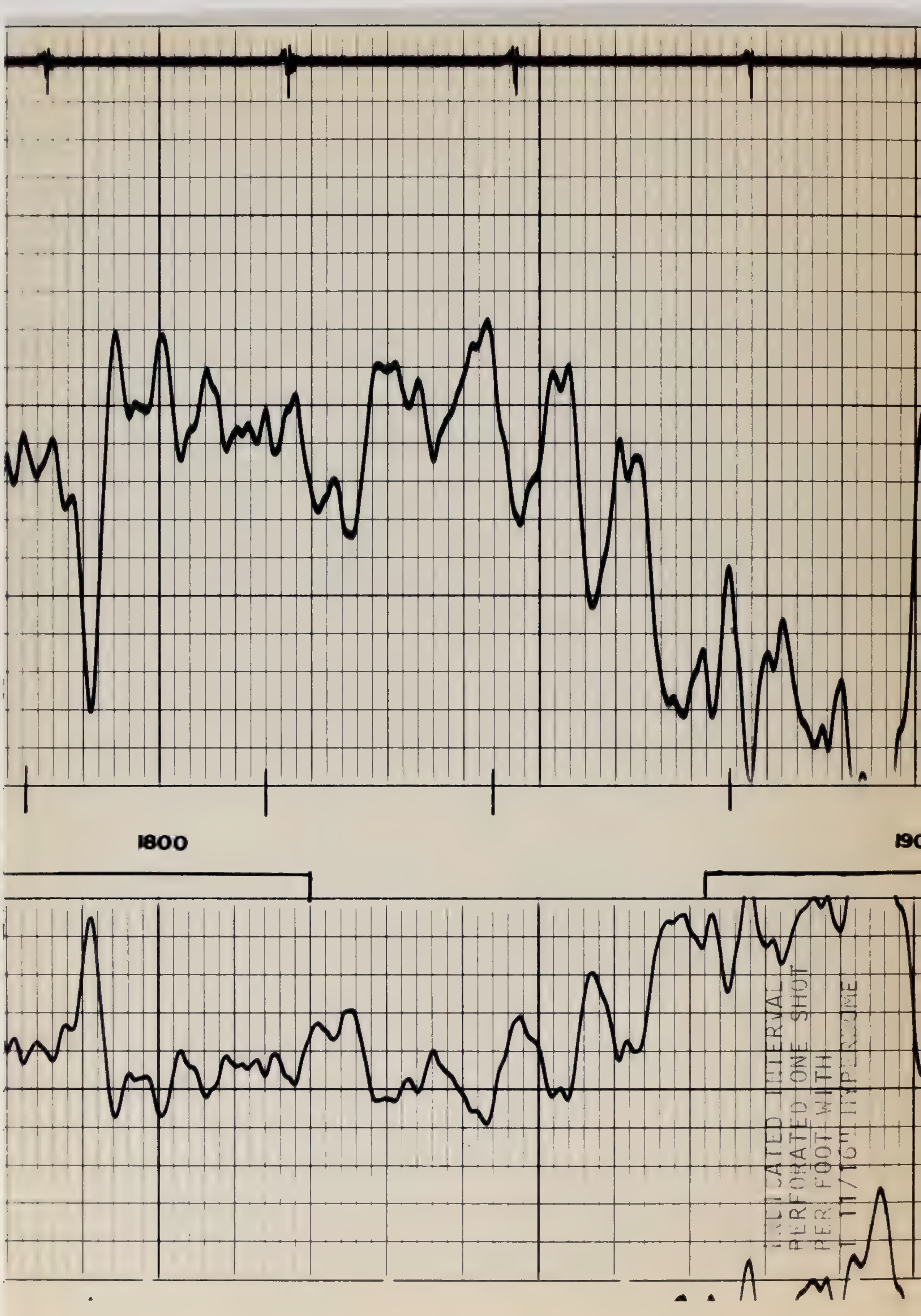

1200

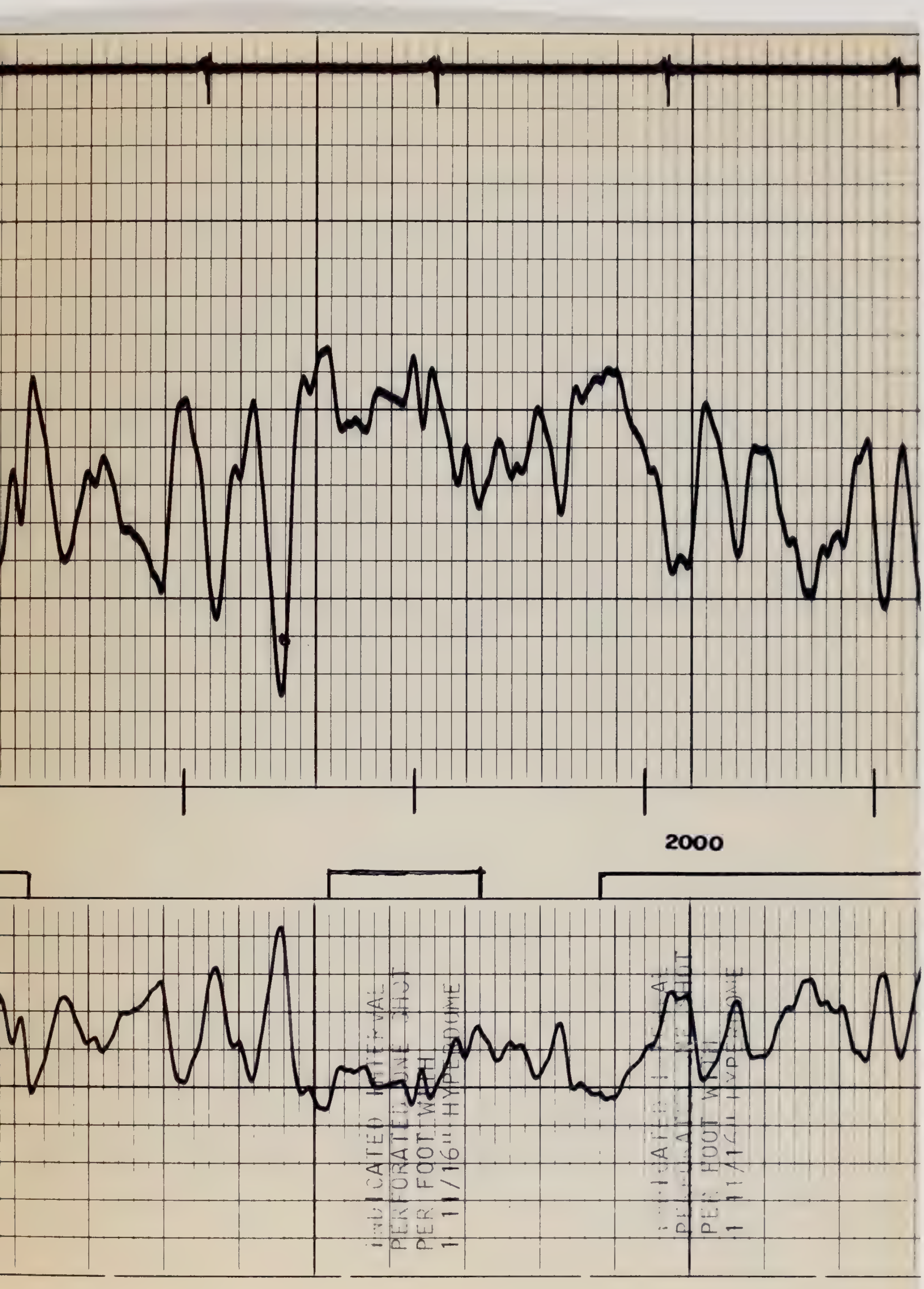

1300
140
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH
1 11/16" HYPERDOME

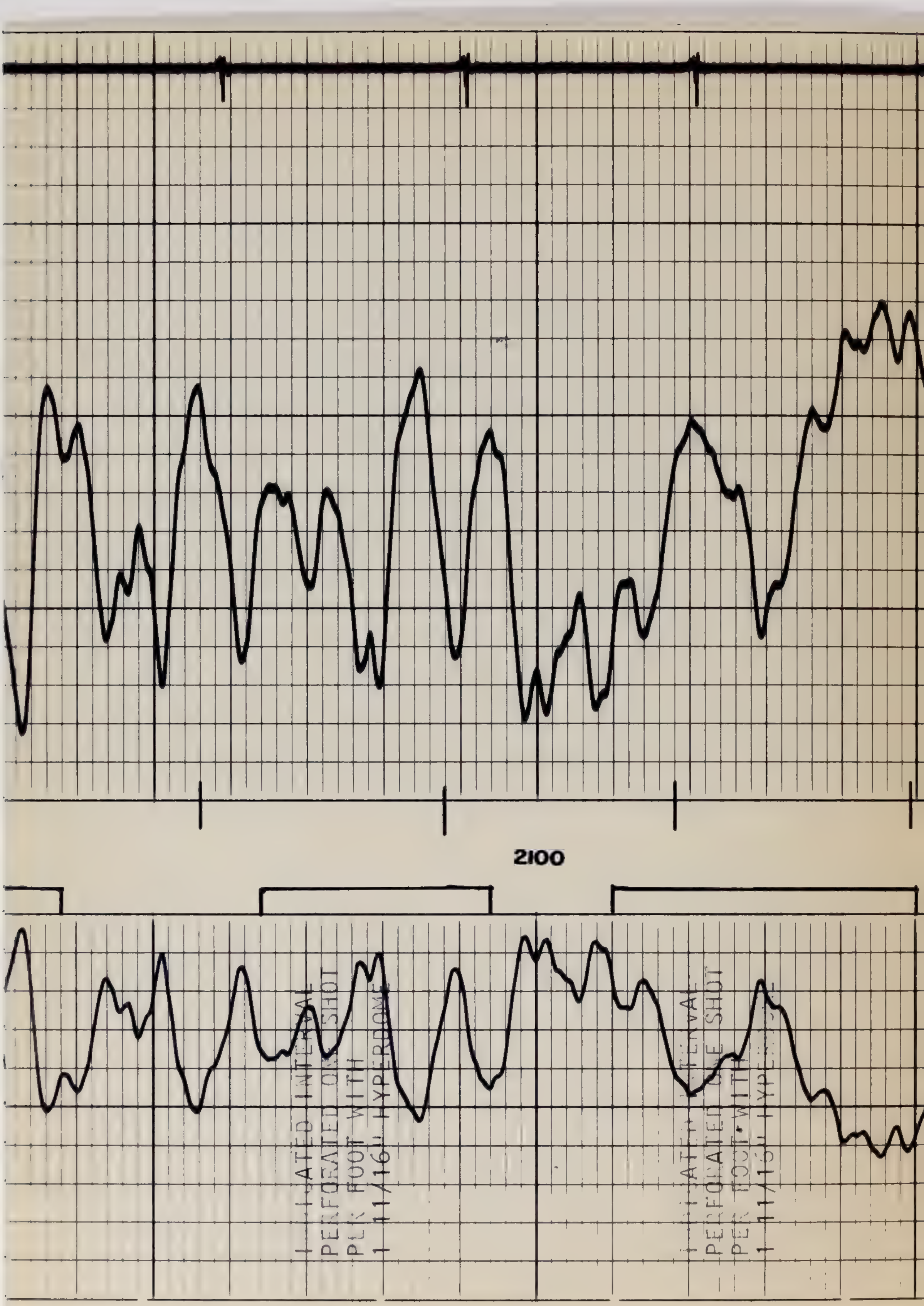

1500
INDICATED INTERVAL

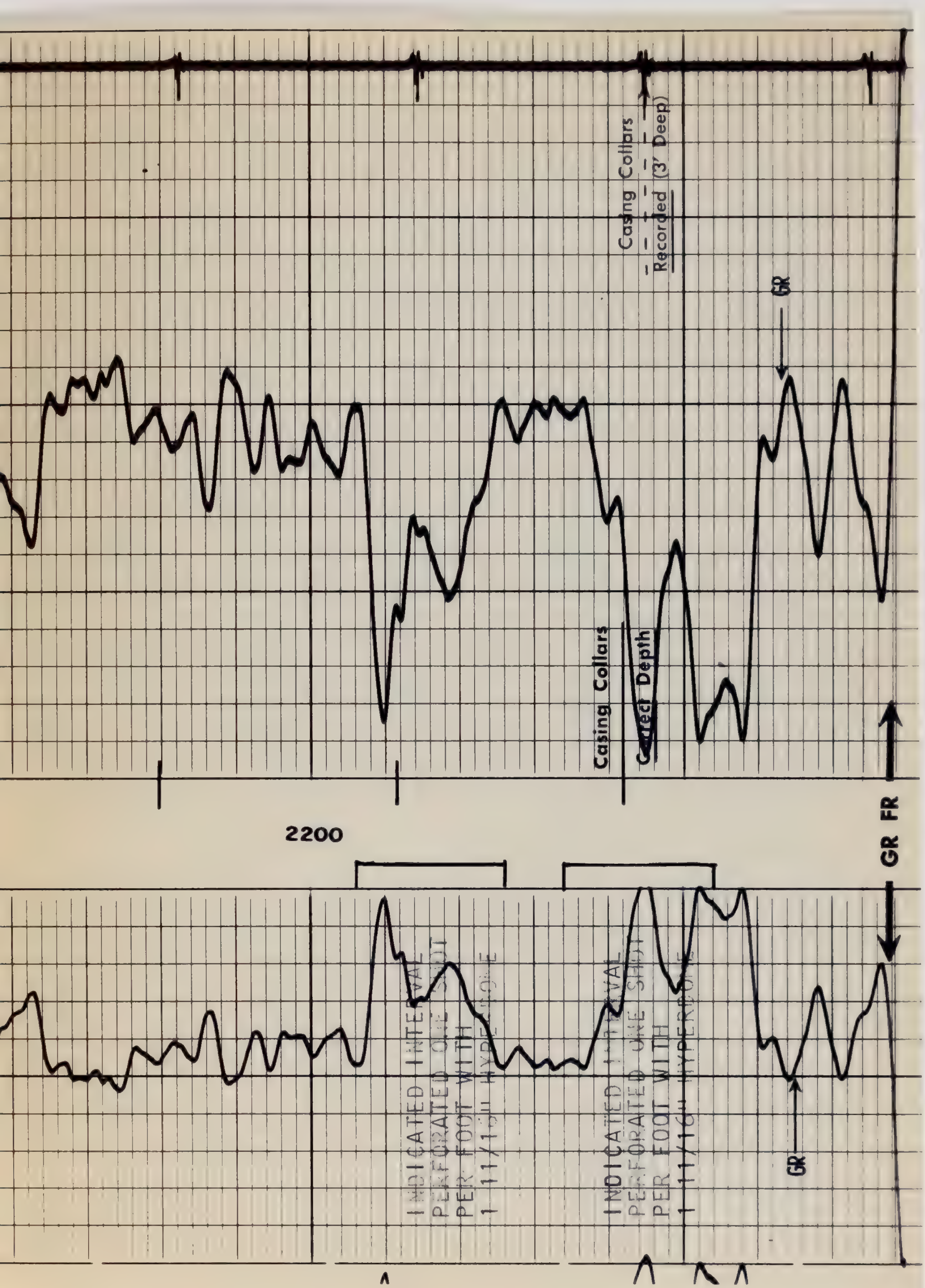
1600
PER FOOT WITH 1 11/16"
HYPERDOME
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH
1 11/16" HYPERDOME

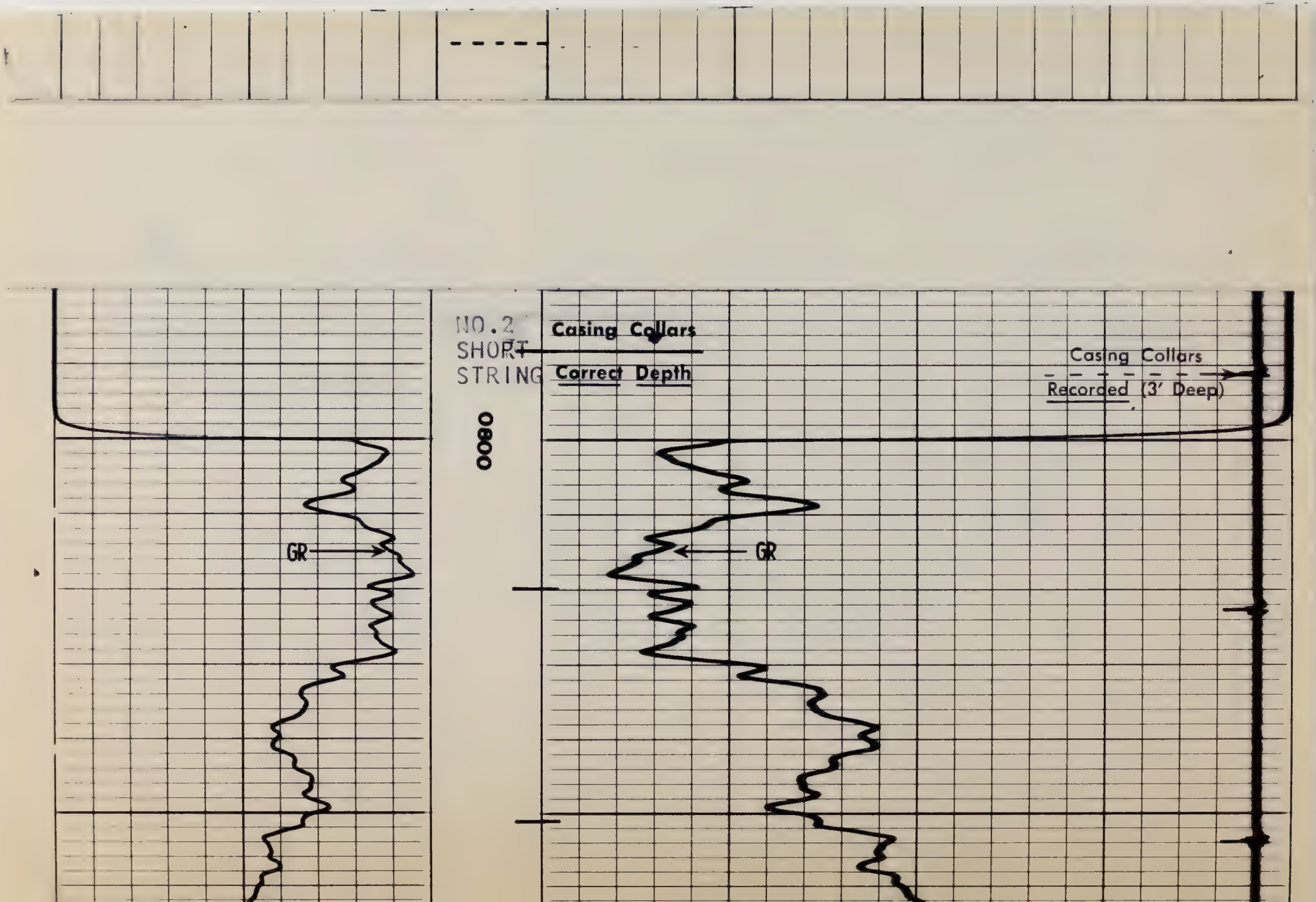

1700
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH
11/16" HYPERDOME

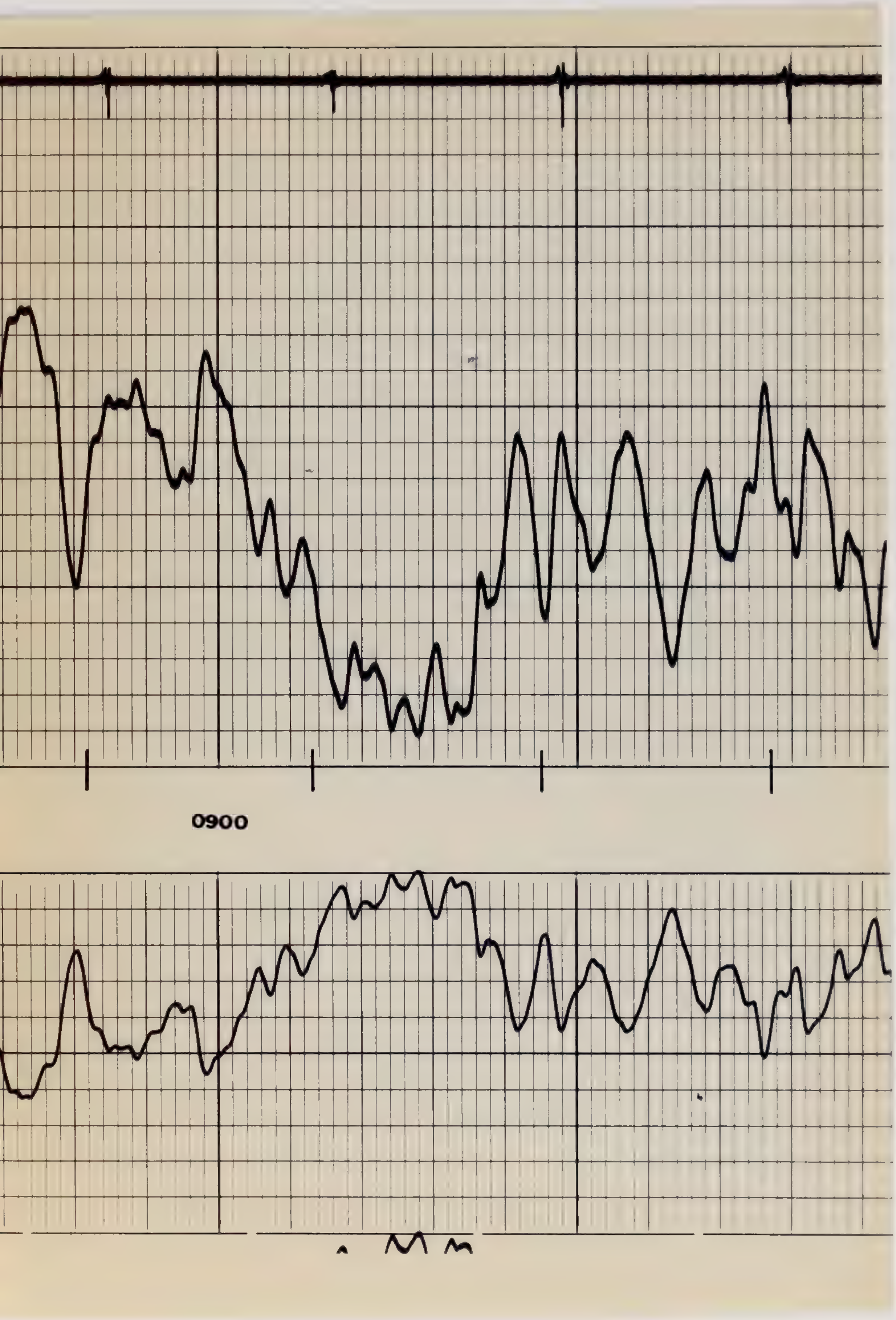

1800
190
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH
11/16" HYPERDOME

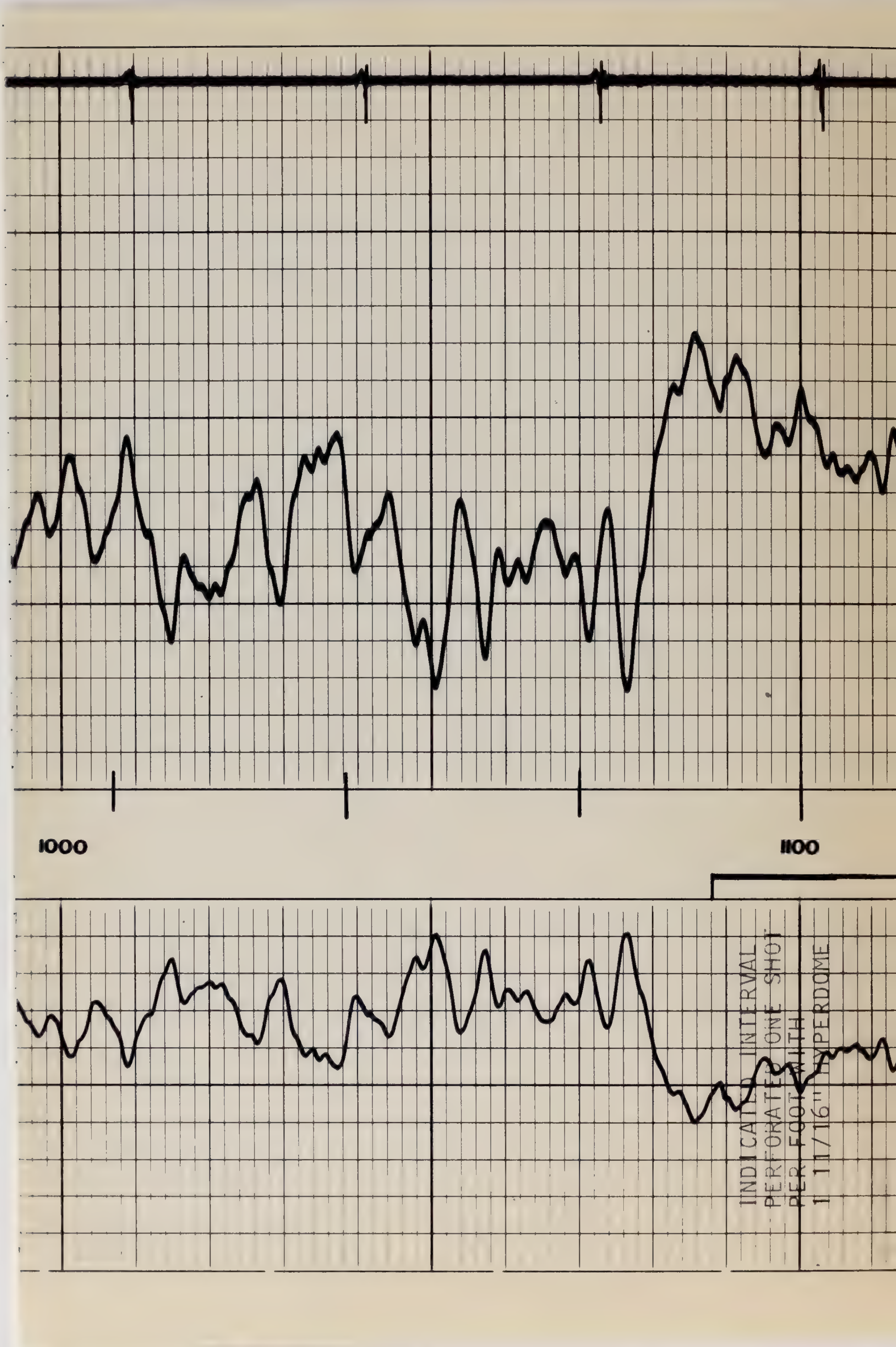

2000
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH
1 11/16" HYPERDOME
ONE SHOT
PER FOOT WITH
1 11/16" HYPERDOME

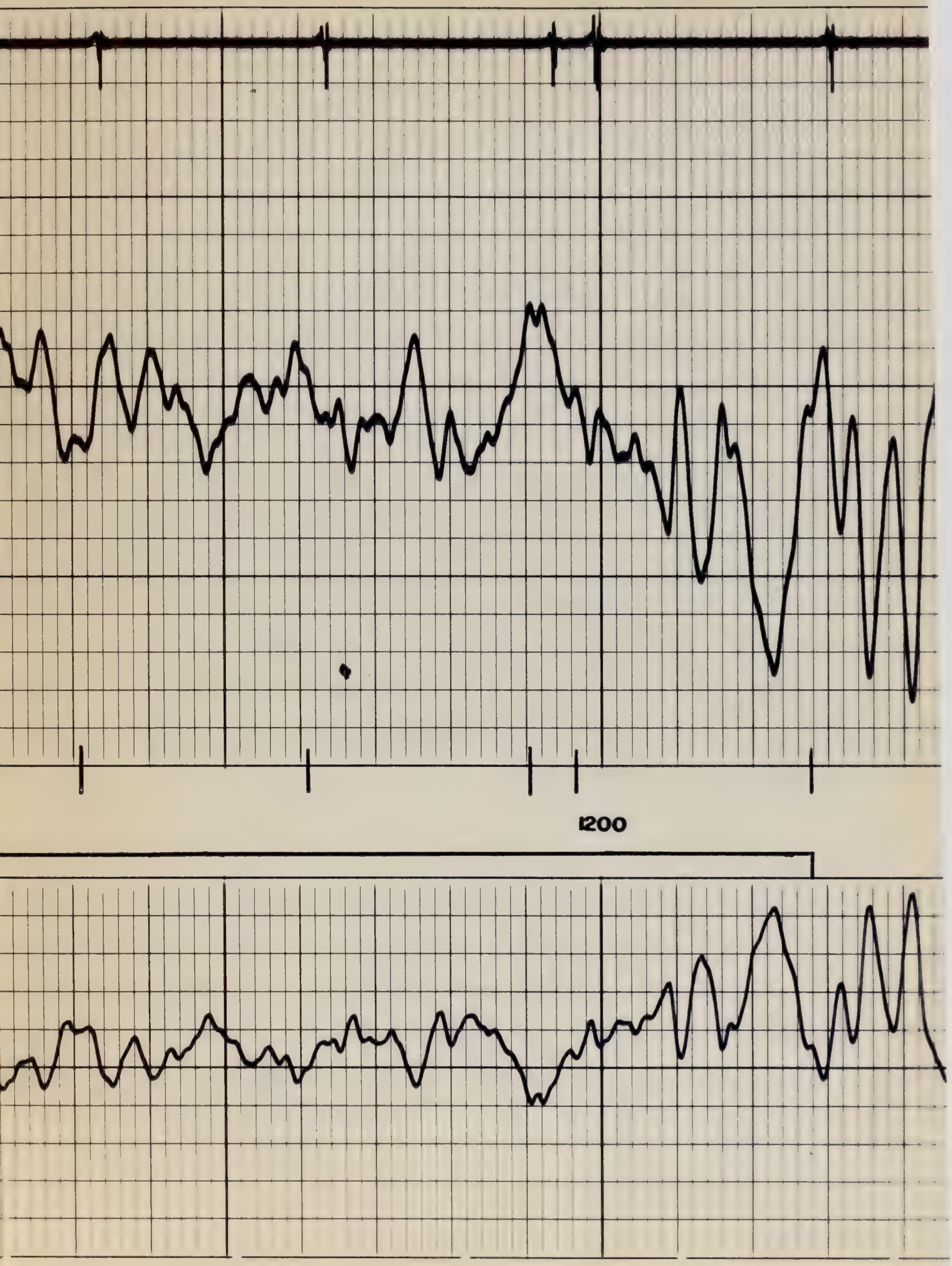

2100
PERFORATED ONE SHOT
PER FOOT WITH
1 11/16" HYPERDOME
PERFORATED ONE SHOT
PER FOOT WITH
1 11/16"

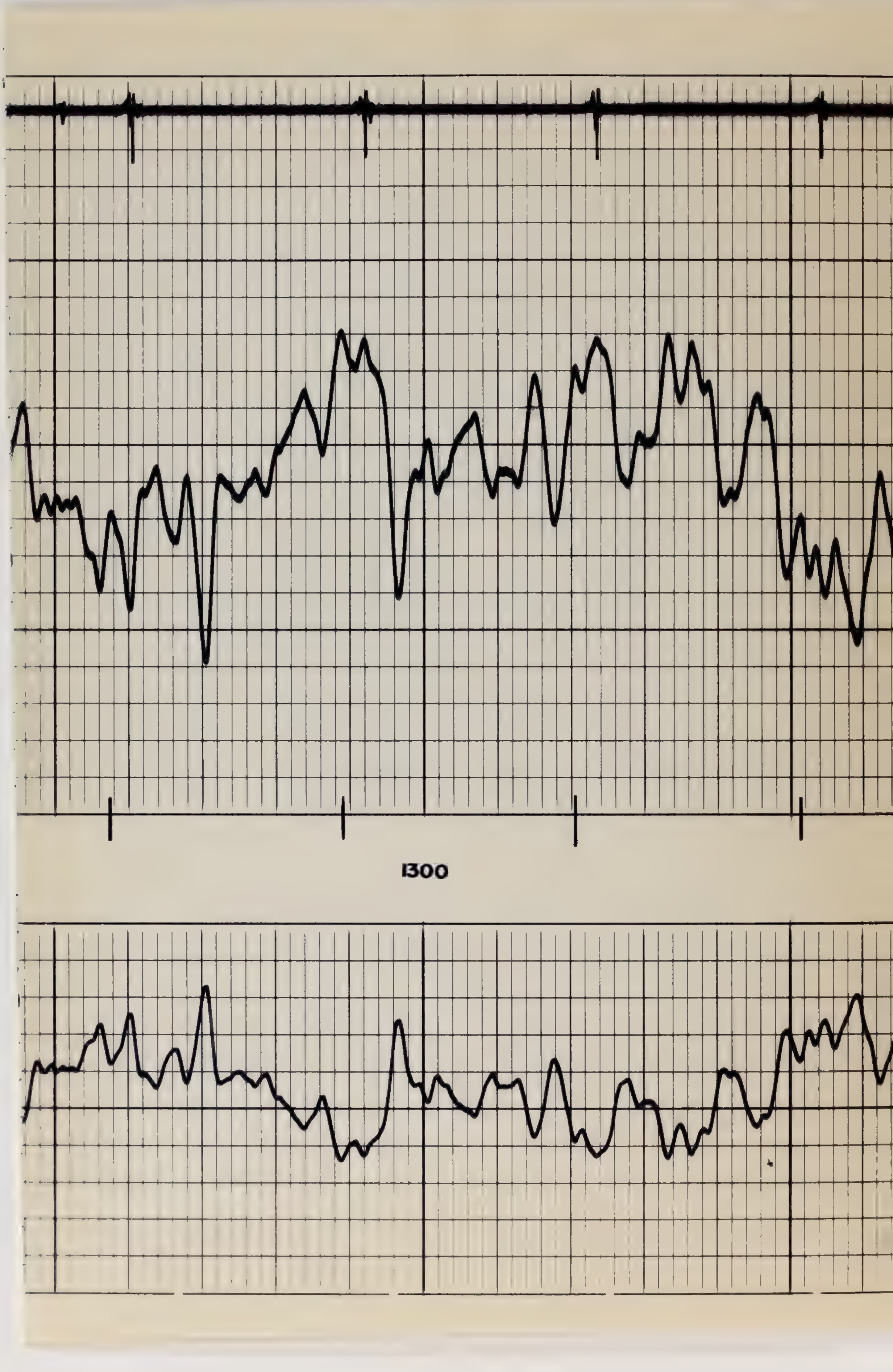

Casing Collars
Recorded (3' Deep)
GR
Casing Collars
Correct Depth
2200
GR
FR
INDICATED INTERVAL PERFORATED ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME
INDICATED INTERVAL PERFORATED ONE SHOT PER FOOT WITH 1 11/16" HYPERDOME
GR

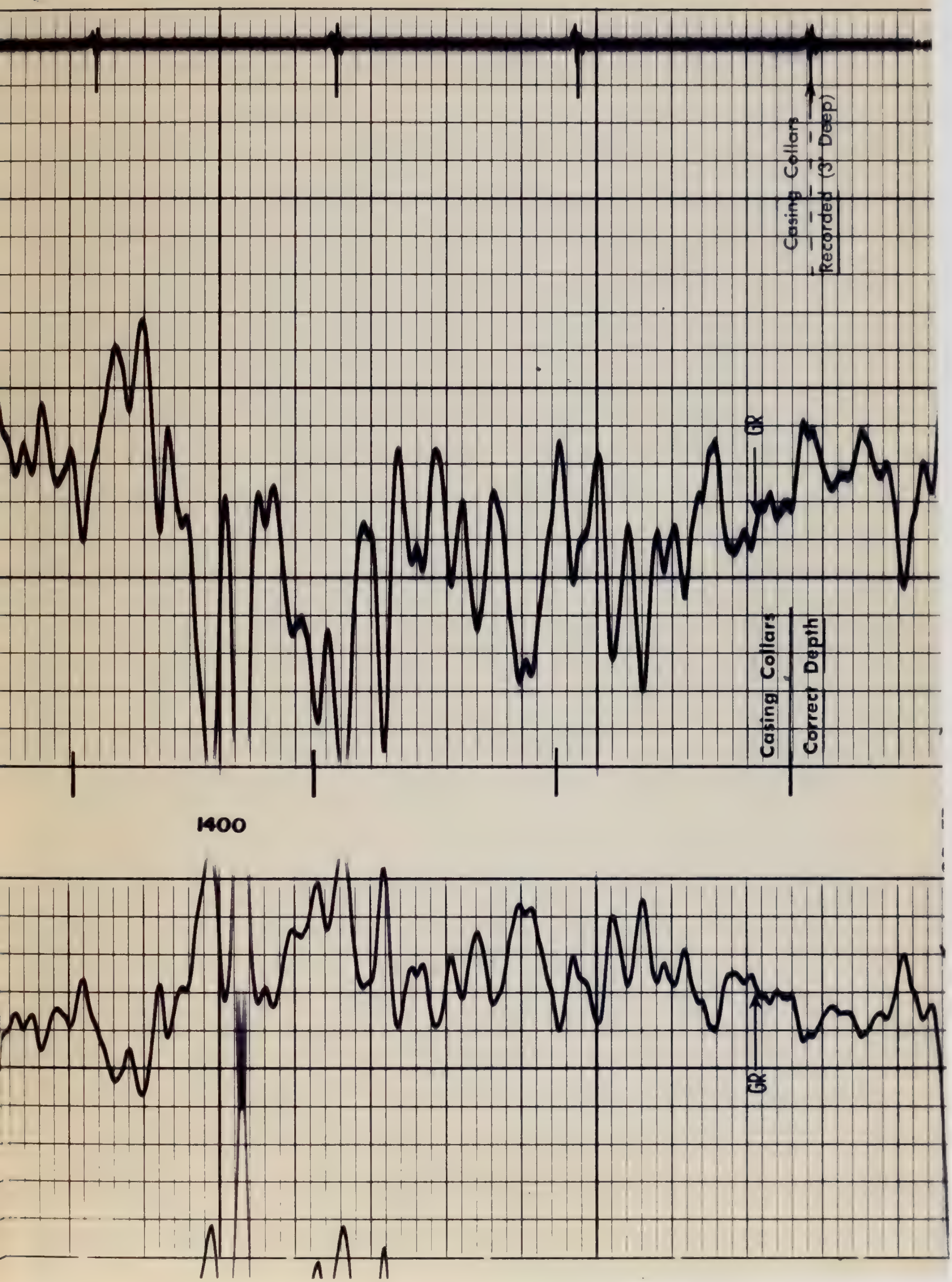

NO.2
SHORT
STRING
Casing Collars
Correct Depth
Casing Collars
Recorded (3' Deep)
0800
GR
GR

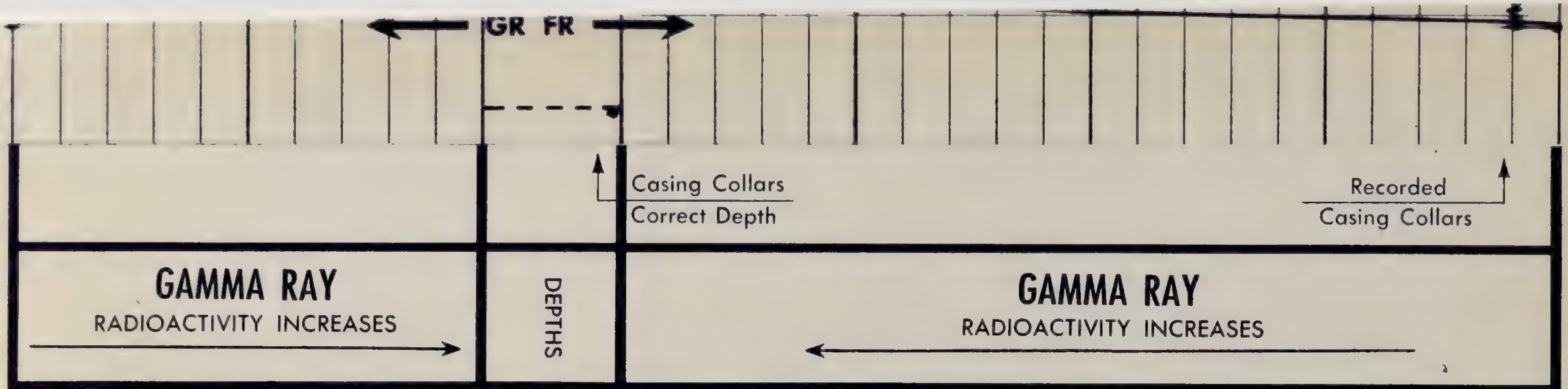

0900


1000
1100
INDICATED INTERVAL
PERFORATED ONE SHOT
PER FOOT WITH
1 11/16" HYPERDOME


1200


1300


Casing Collars
Recorded (3' Deep)
GR
Casing Collars
Correct Depth
1400
GR


GR FR
Casing Collars
Correct Depth
Recorded
Casing Collars
GAMMA RAY
RADIOACTIVITY INCREASES
DEPTHS
GAMMA RAY
RADIOACTIVITY INCREASES

COMPANY ATLANTIC RICHFIELD COMPANY

WELL S.G. NO.17

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 2277
SCHL. TD 2285
DRLR. TD 2305

Schlumberger

LATEROLOG
WITH GAMMA RAY

COUNTY RIO BLANCO
FIELD or LOCATION SORGHUM GULCH
WELL SORGHUM GULCH 1-A
COMPANY ATLANTIC RICHFIELD

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH 1-A

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

LOCATION

Sec. 2 Twp. 3S Rge. 97W

Other Services:
FDC-GR
BHC-GR
TEMP./AMP.-VDL

Permanent Datum: GL , Elev.
Log Measured From GL , 0 Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B.
D.F.
G.L.

Date	2-1-75			
Run No.	ONE			
Depth—Driller	1180			
Depth—Logger	1182			
Btm. Log Interval	1179			
Top Log Interval	230			
Casing—Driller	7 @ 225	@	@	@
Casing—Logger	230			
Bit Size	6-1/4			
Type Fluid in Hole	FORMATION WATER			
Dens. | Visc.				
pH | Fluid Loss	ml	ml	ml	ml
Source of Sample				
R_m @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
R_{mc} @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
Source: R_{mf} R_{mc}				
R_m @ BHT	@ °F	@ °F	@ °F	@ °F
Time Since Circ.				
Max. Rec. Temp.	°F	°F	°F	°F
Equip. | Location	5602 | GJ			
Recorded By	GEIGER			
Witnessed By	POWERS			

FOLD HERE

The well name, location and borehole reference data were

The well name, location and borehole reference data were furnished by the customer.

REMARKS * NO CIRCULATED SAMPLE WAS AVAILABLE

Changes in Mud Type or Additional Samples				
Date | Sample No.				
Depth—Driller				
Type Fluid in Hole				
Dens. | Visc.				
pH | Fluid Loss		ml		
Source of Sample				
R_m @ Meas. Temp.	@	°F	@	°F
R_{mf} @ Meas. Temp.	@	°F	@	°F
R_{mc} @ Meas. Temp.	@	°F	@	°F
Source: R_{mf} | R_{mc}				
R_m @ BHT	@	°F	@	°F
R_{mf} @ BHT	@	°F	@	°F
R_{mc} @ BHT	@	°F	@	°F

Scale Changes

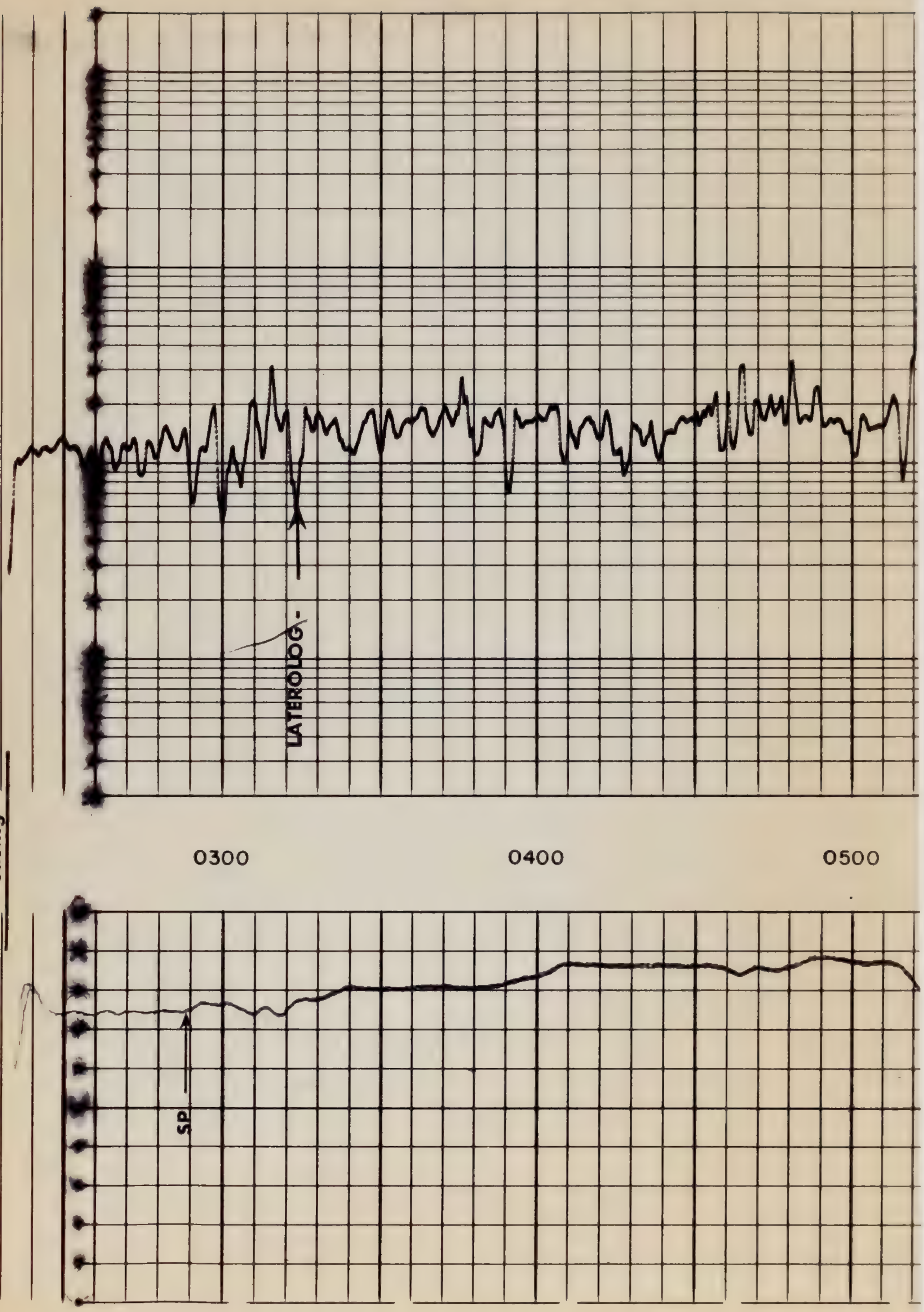
Type Log	Depth	Scale Up Hole	Scale Down Hole

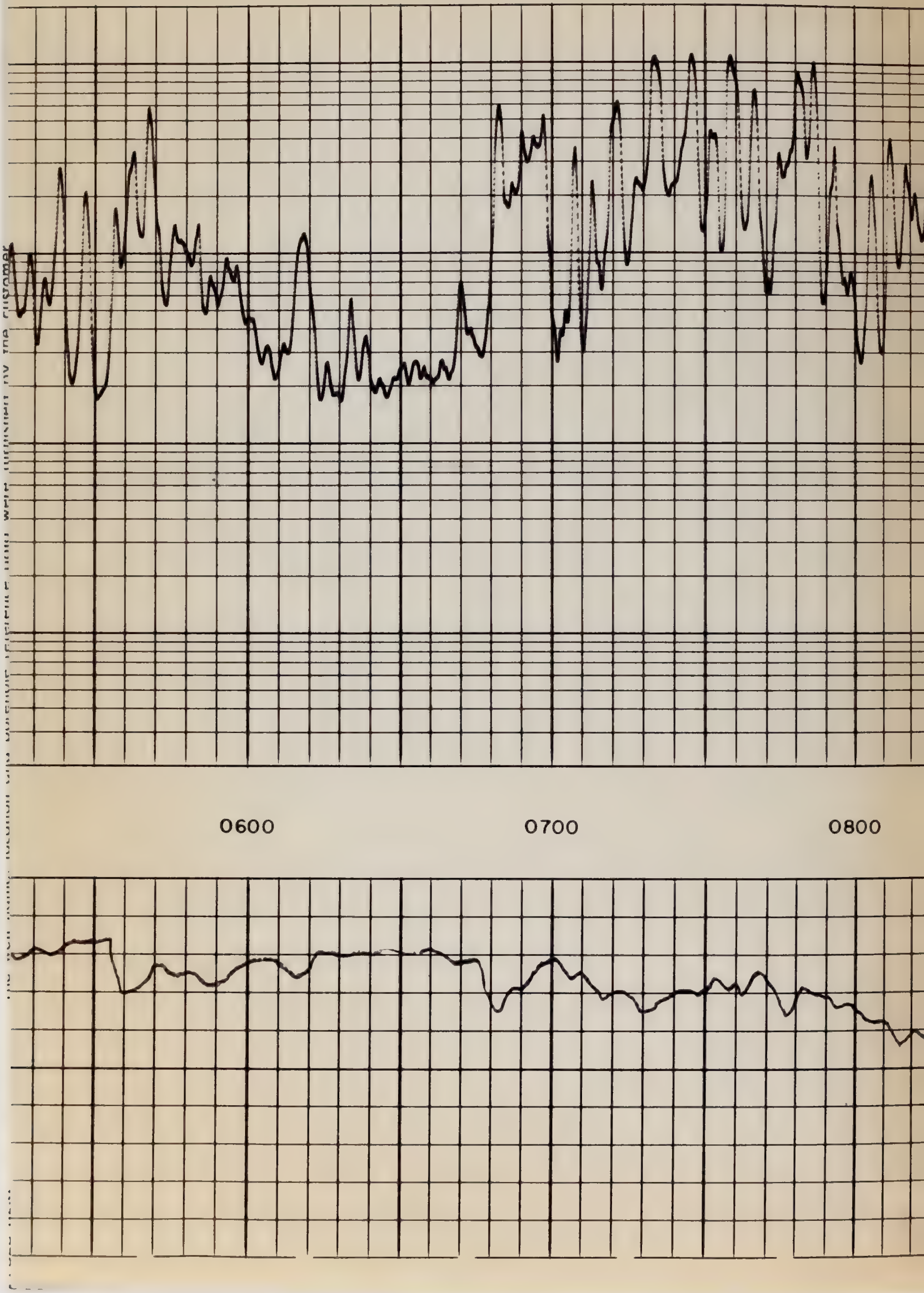
Equipment Data

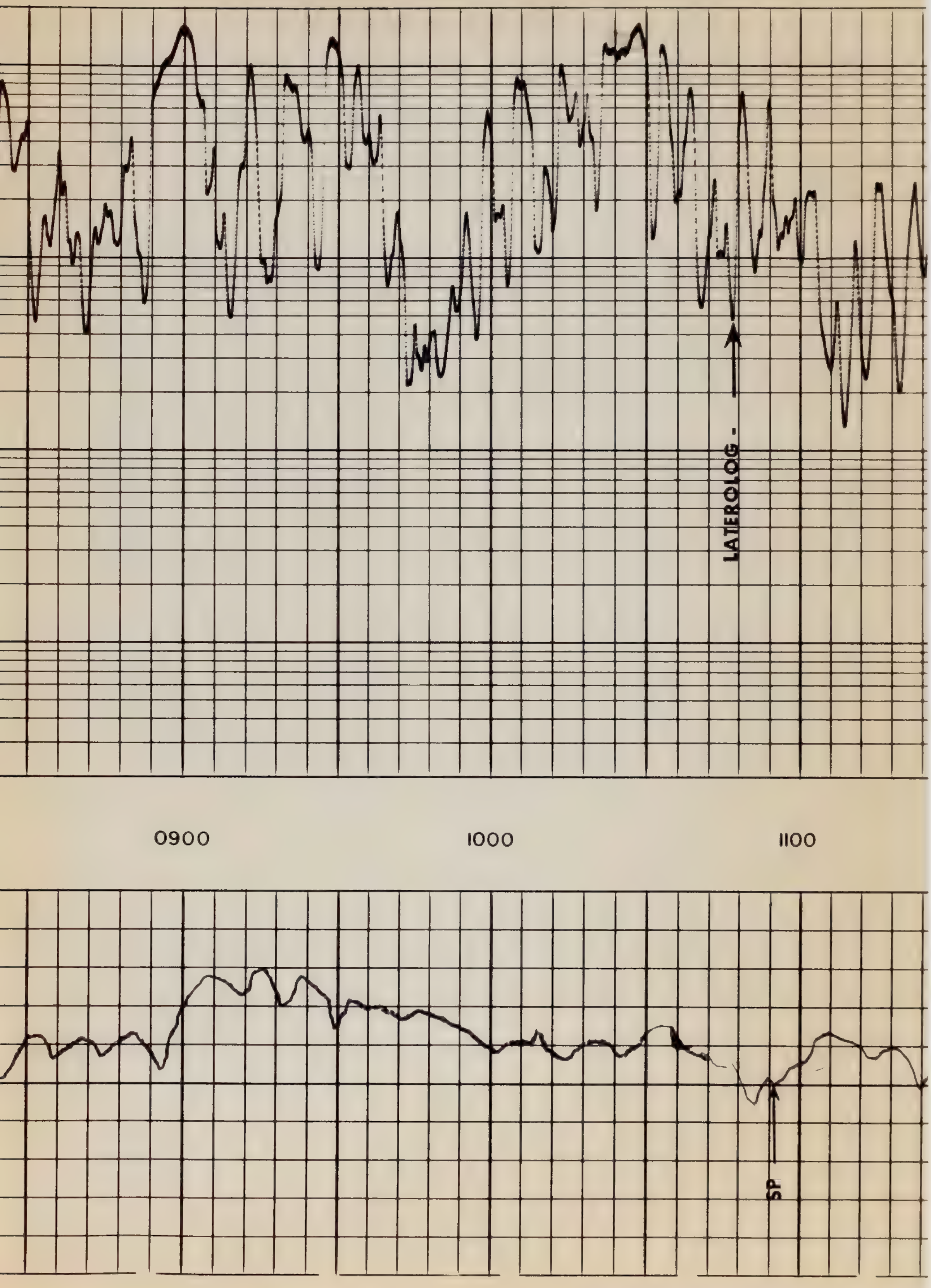
Run No.	Tool Type	Pad Type	Tool Pos.	Other

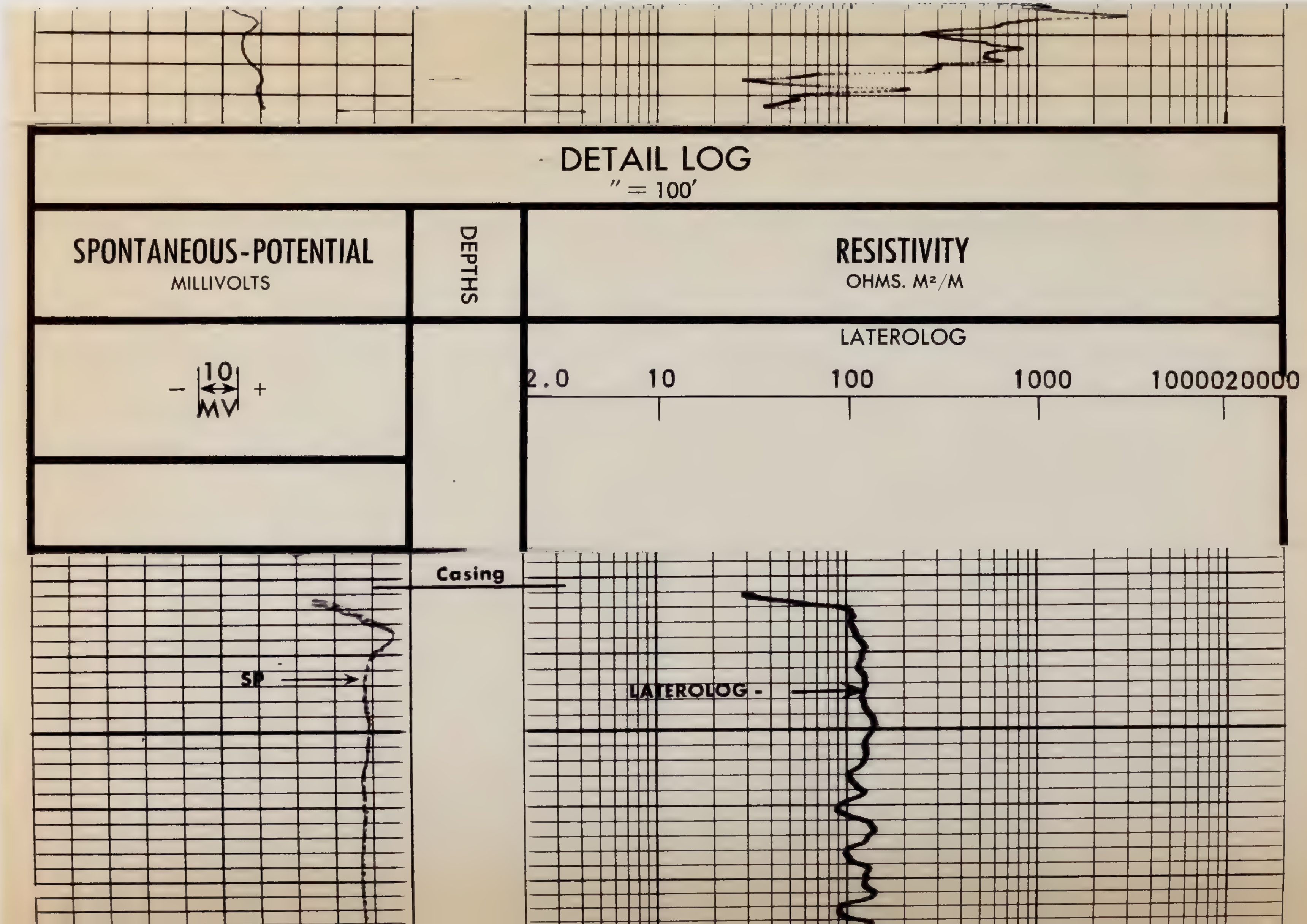
Equip. Used: CART. No.
PANEL No. E-790
SONDE No. 850
Spacing: BEAM WIDTH: LL-7 USED
GUARD LENGTH: LL-7 USED

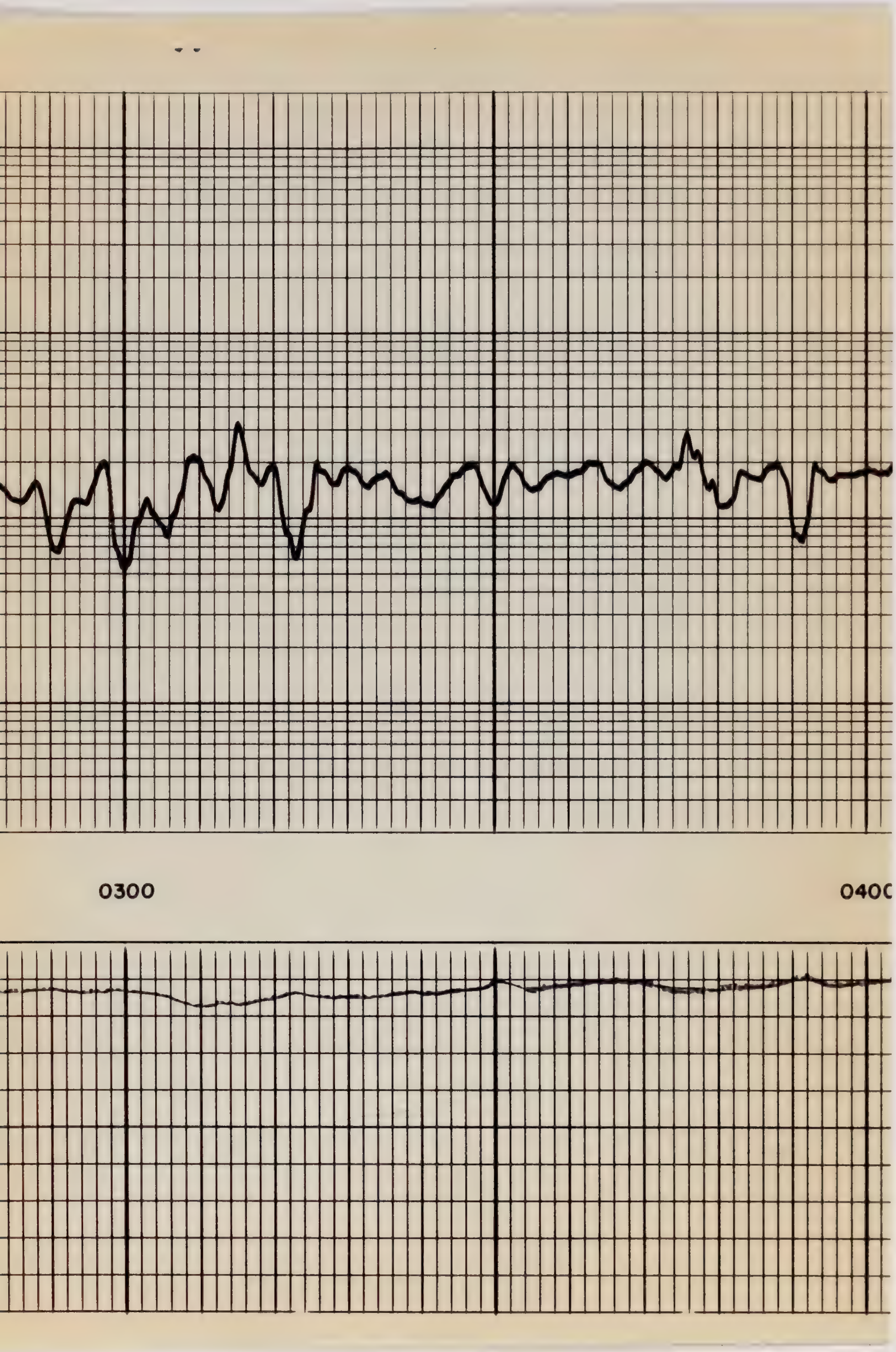
SPONTANEOUS POTENTIAL millivolts	Depths	RESISTIVITY ohms. m^2/m
10		LATEROLOG 2.0 1 0 100 1000 10000 20000

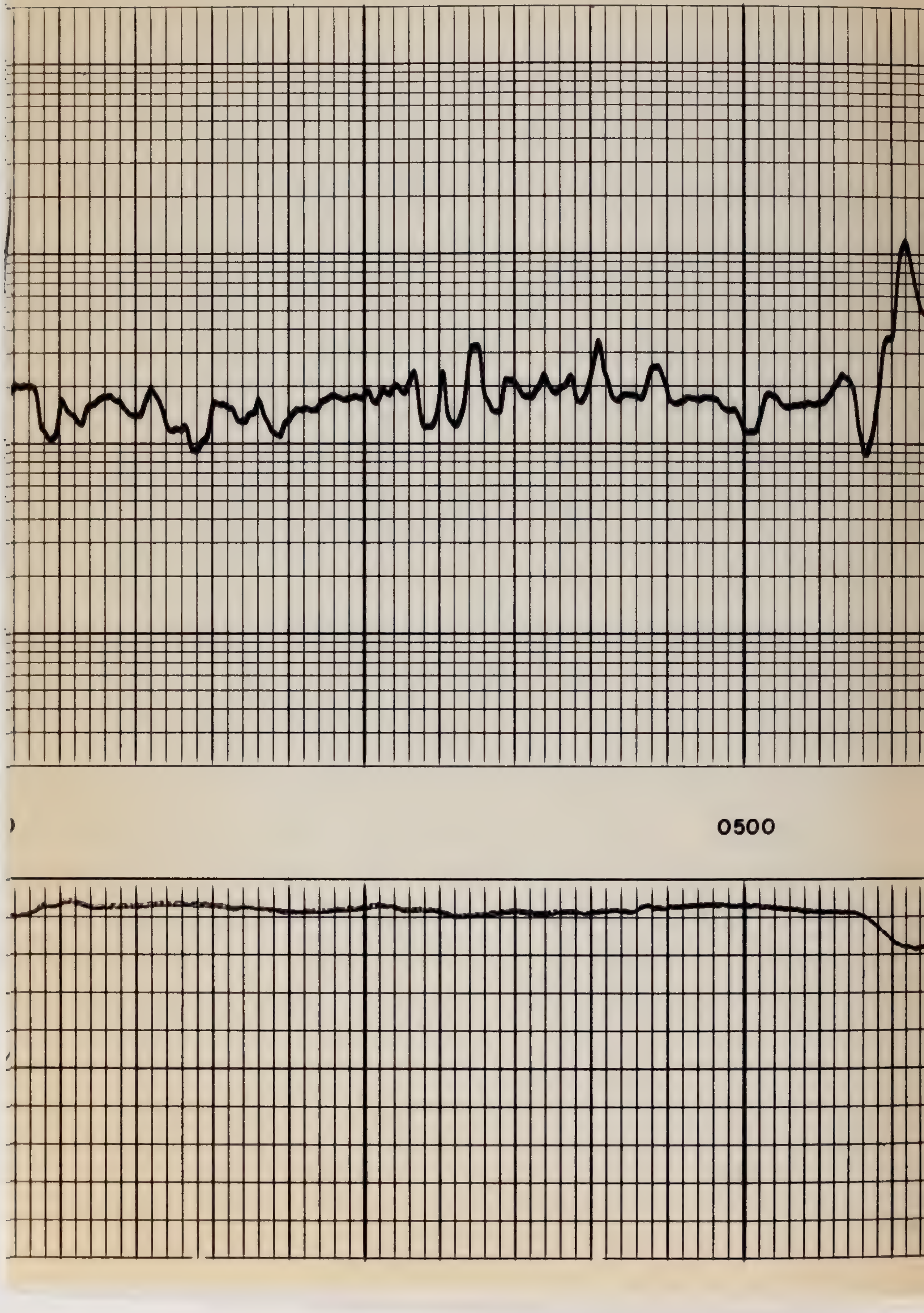

Casing
LATEROLOG
0300
0400
0500
SP

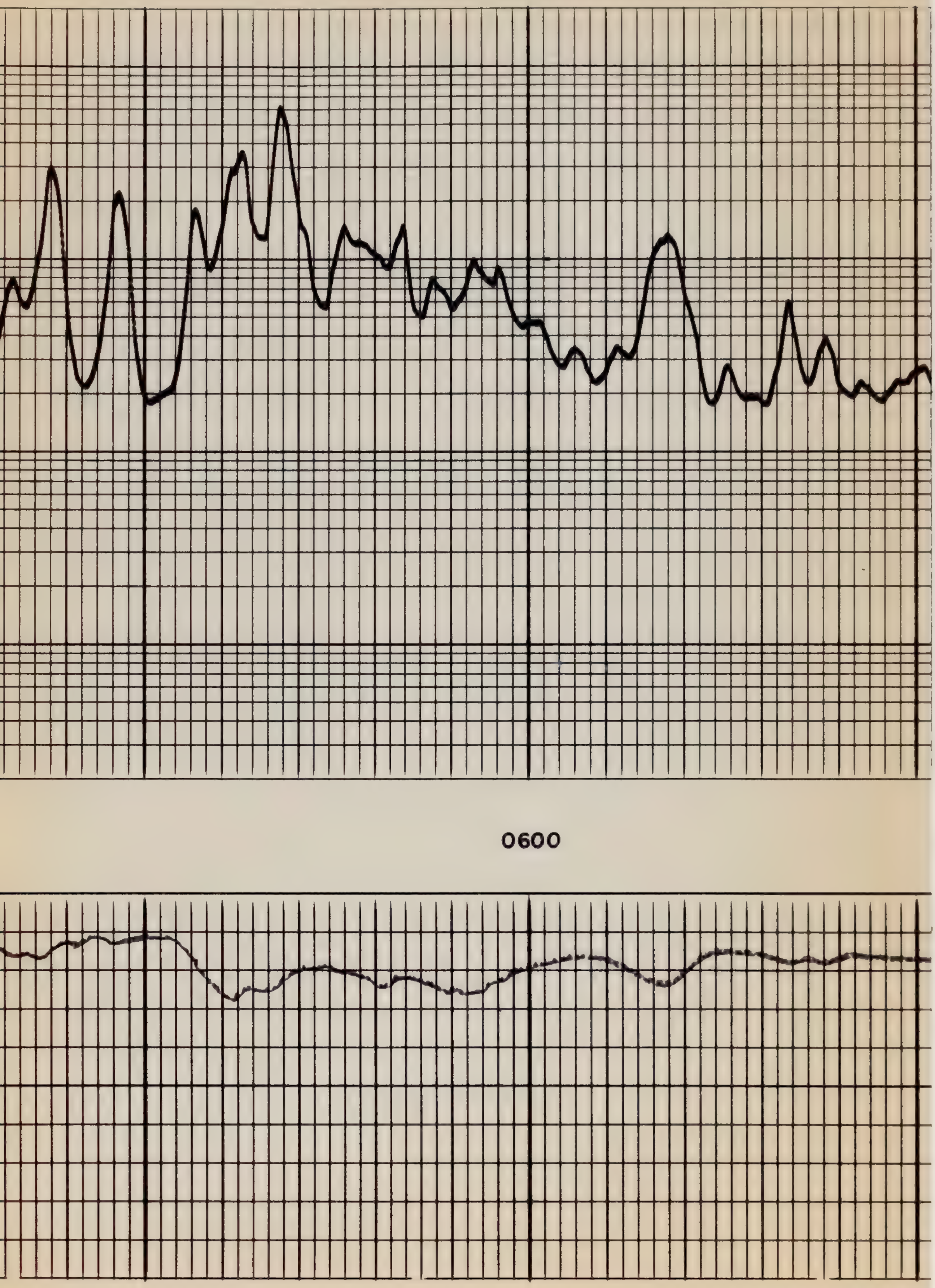

0600
0700
0800

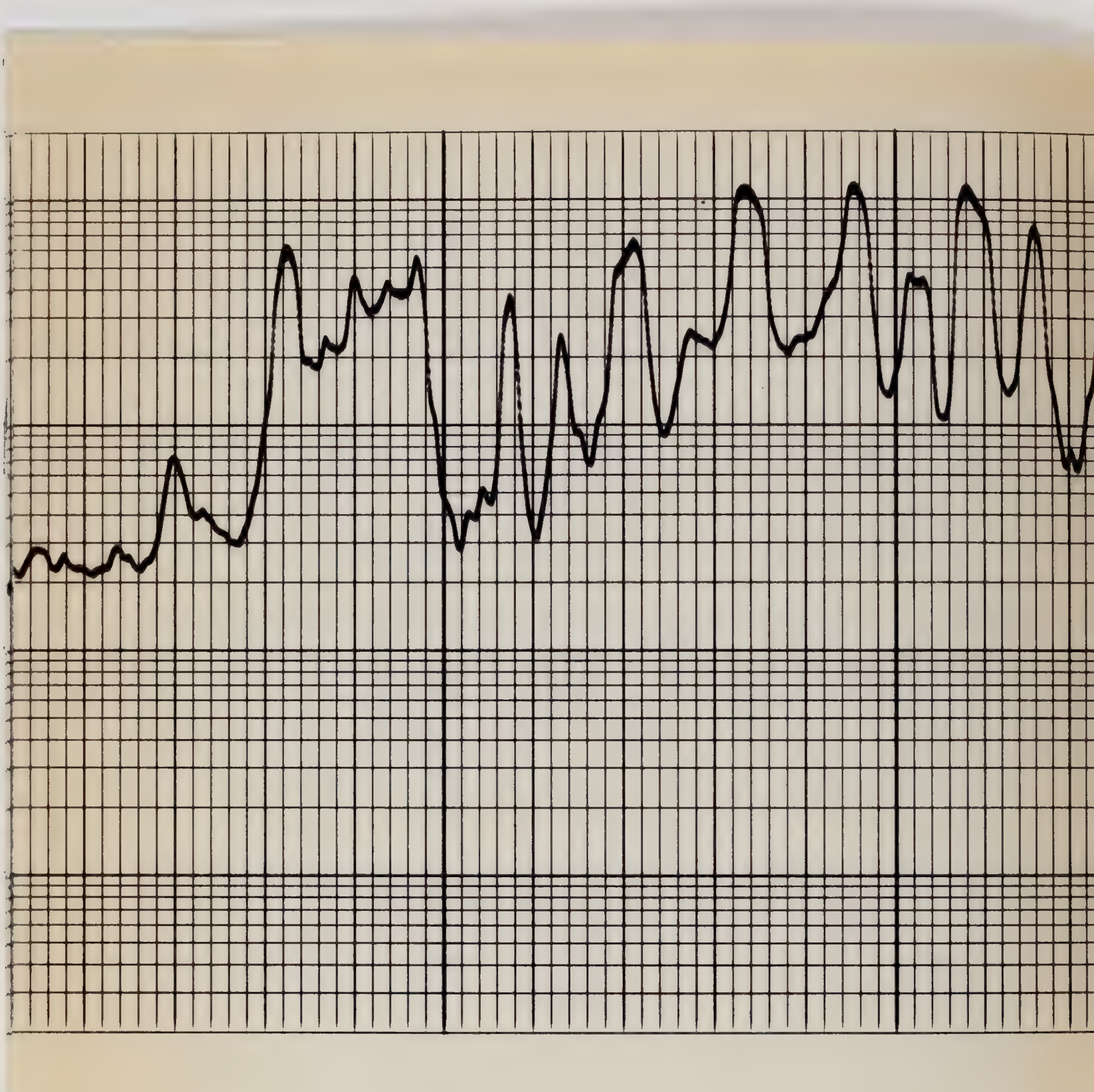

LATEROLOG -
0900
1000
1100
SP

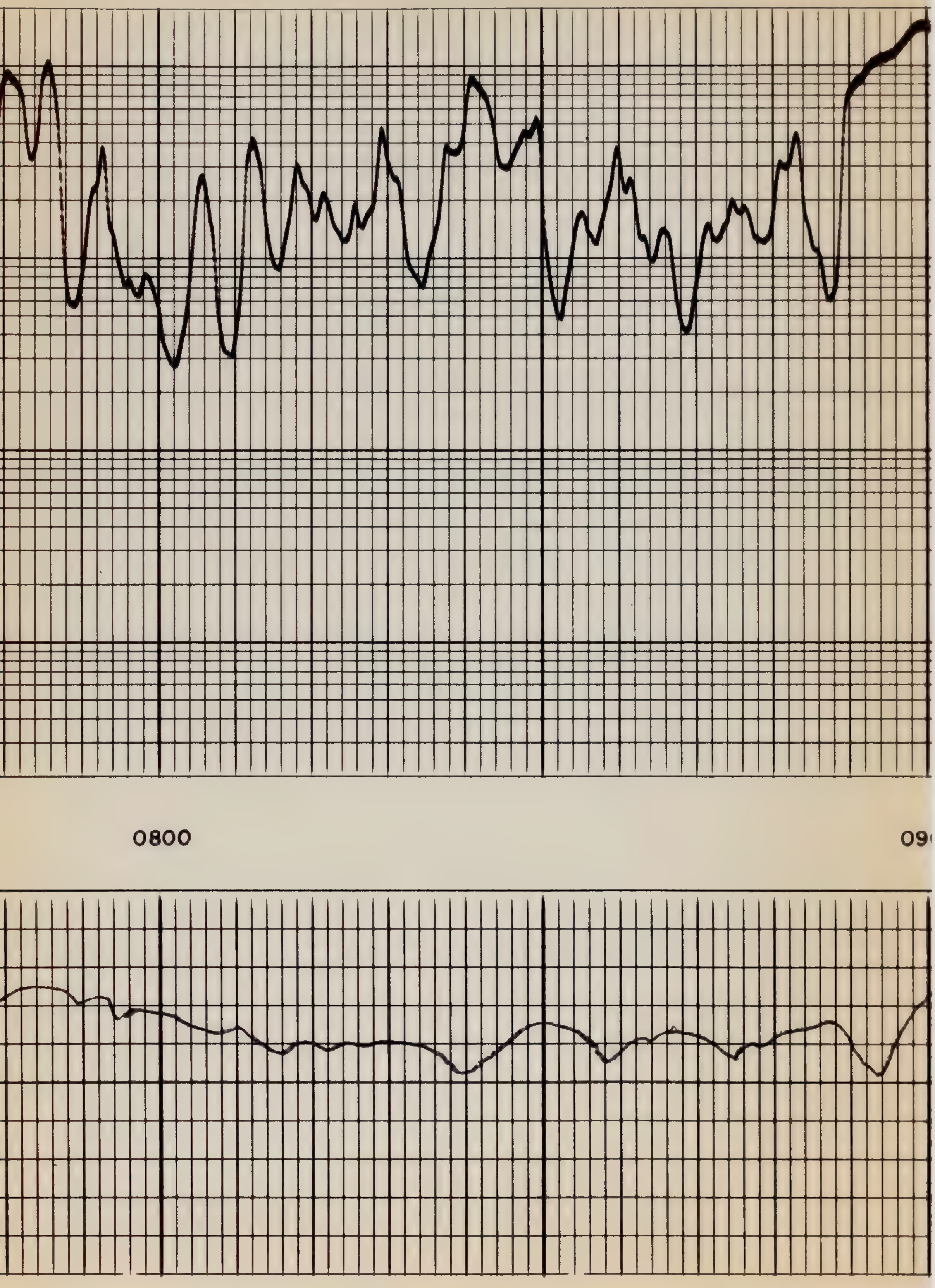

DETAIL LOG
" = 100'
SPONTANEOUS-POTENTIAL
MILLIVOLTS
– 10 MV +
DEPTHS
RESISTIVITY
OHMS. M²/M
LATEROLOG
2.0
10
100
1000
1000020000
Casing
SP
LATEROLOG -

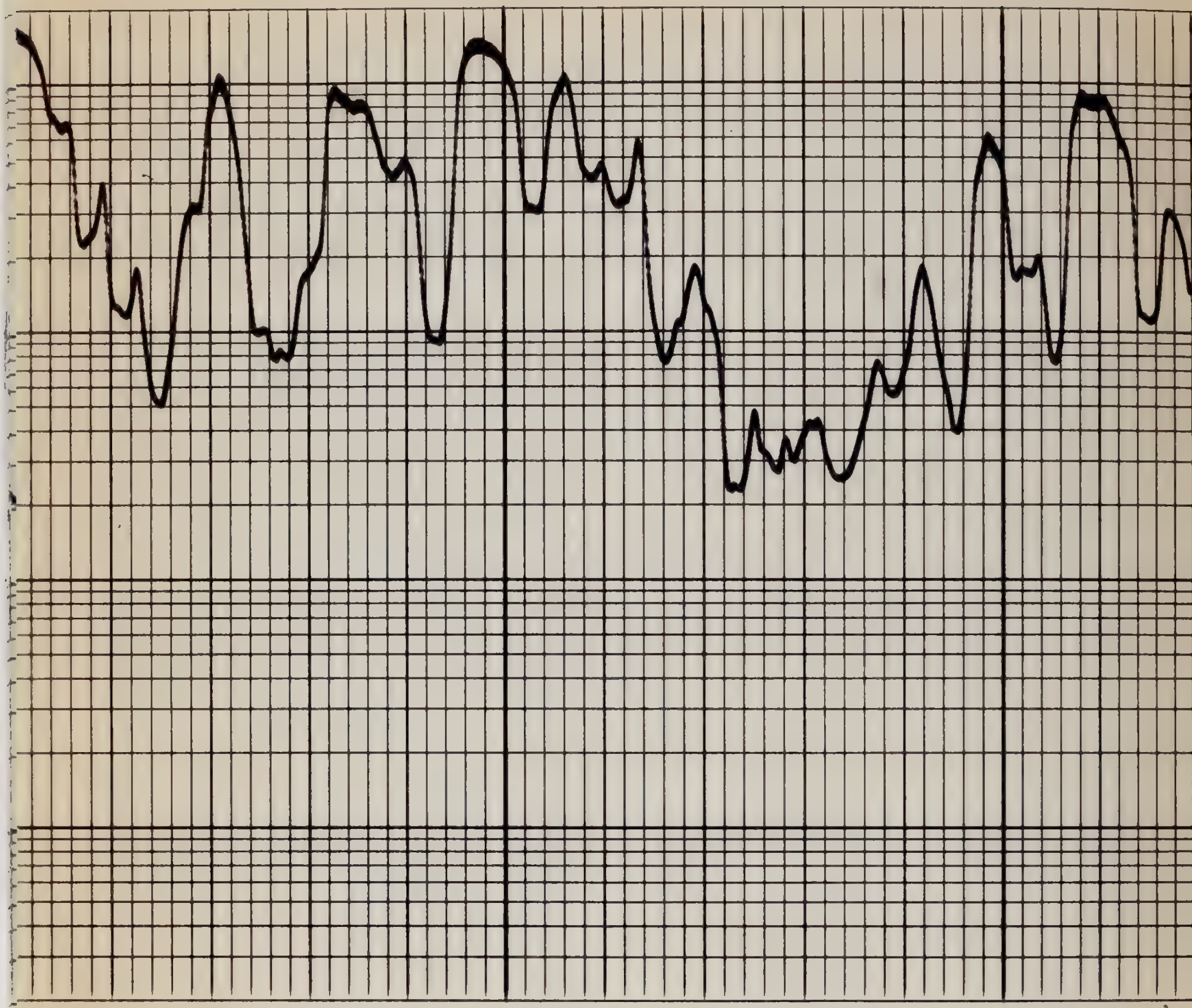

0300
040


0500

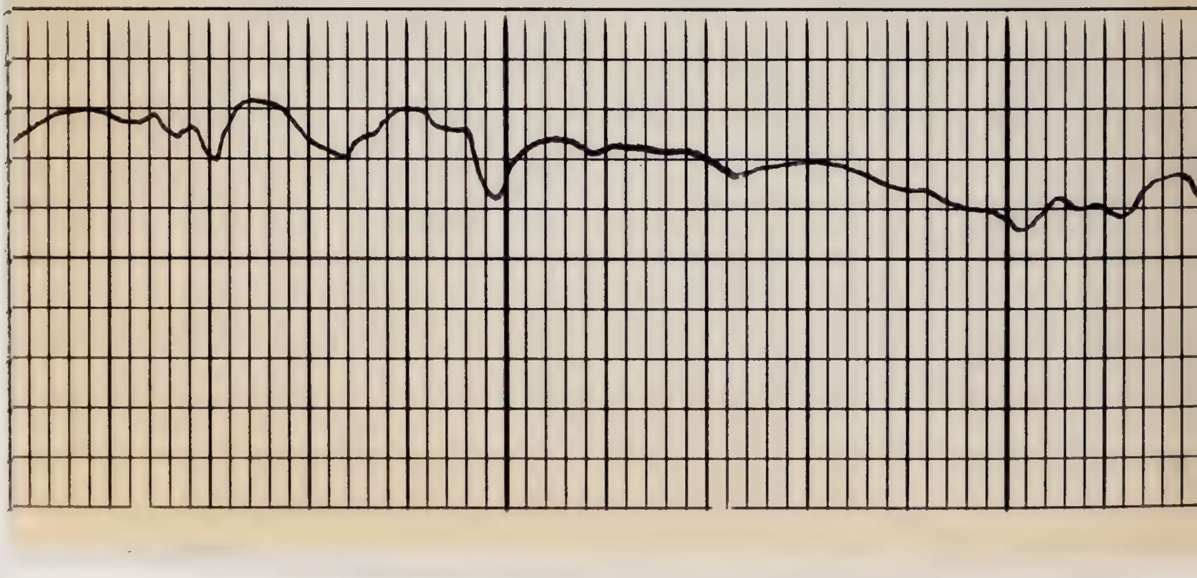

0600

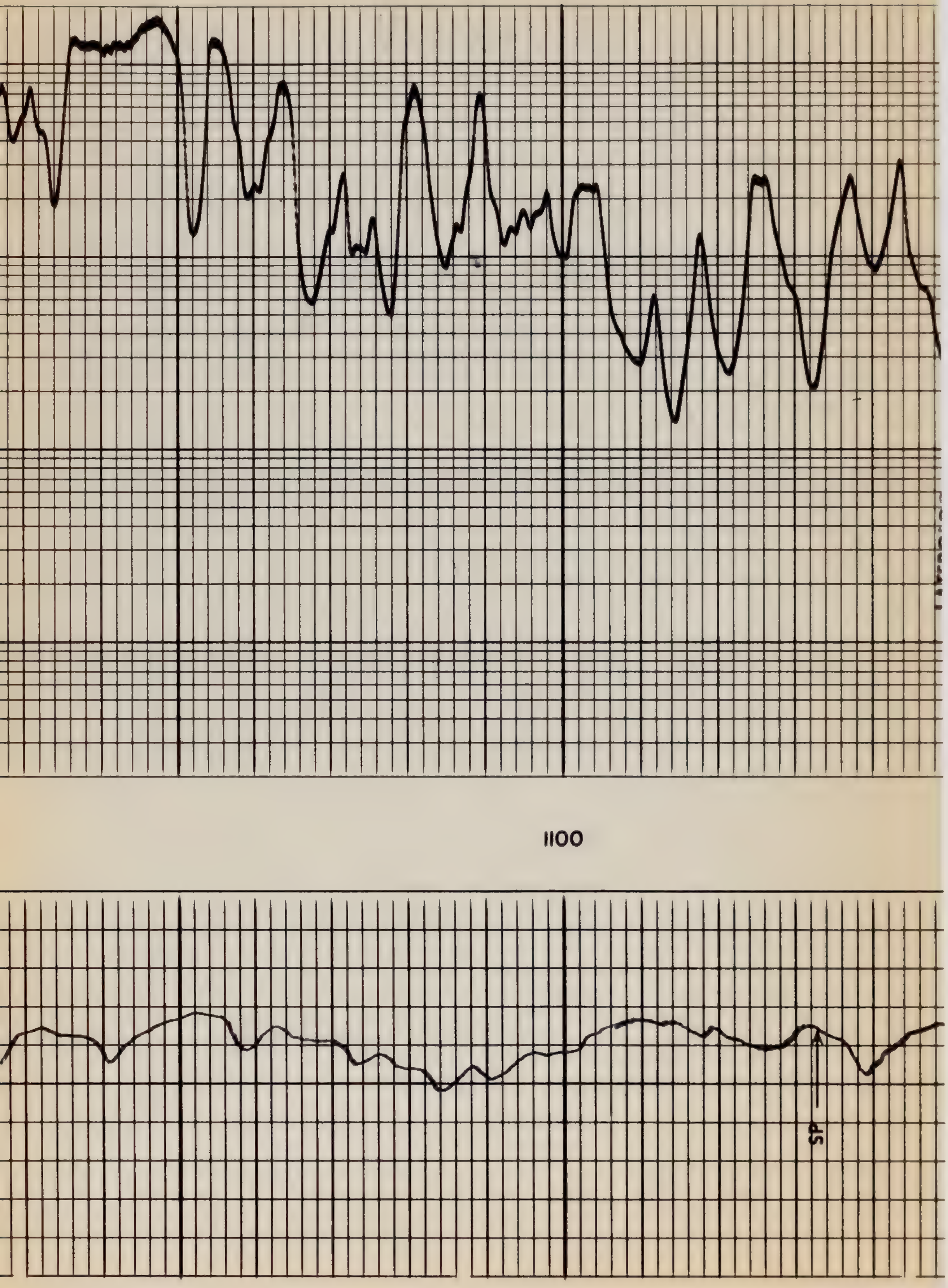

0700

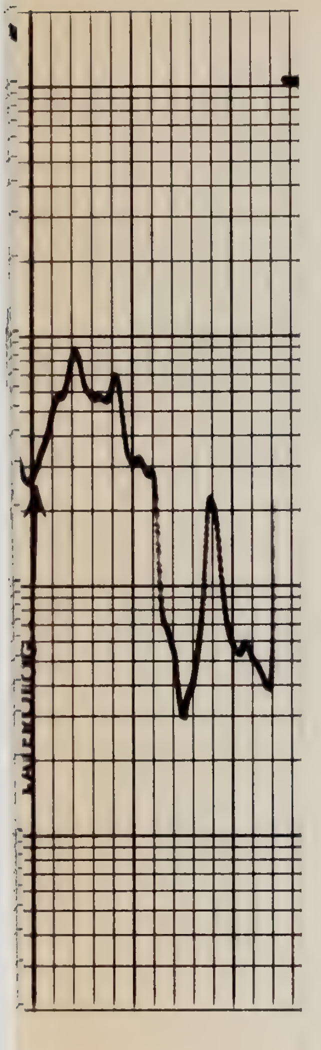

0800
09

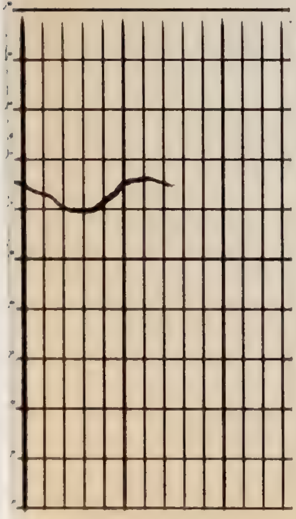


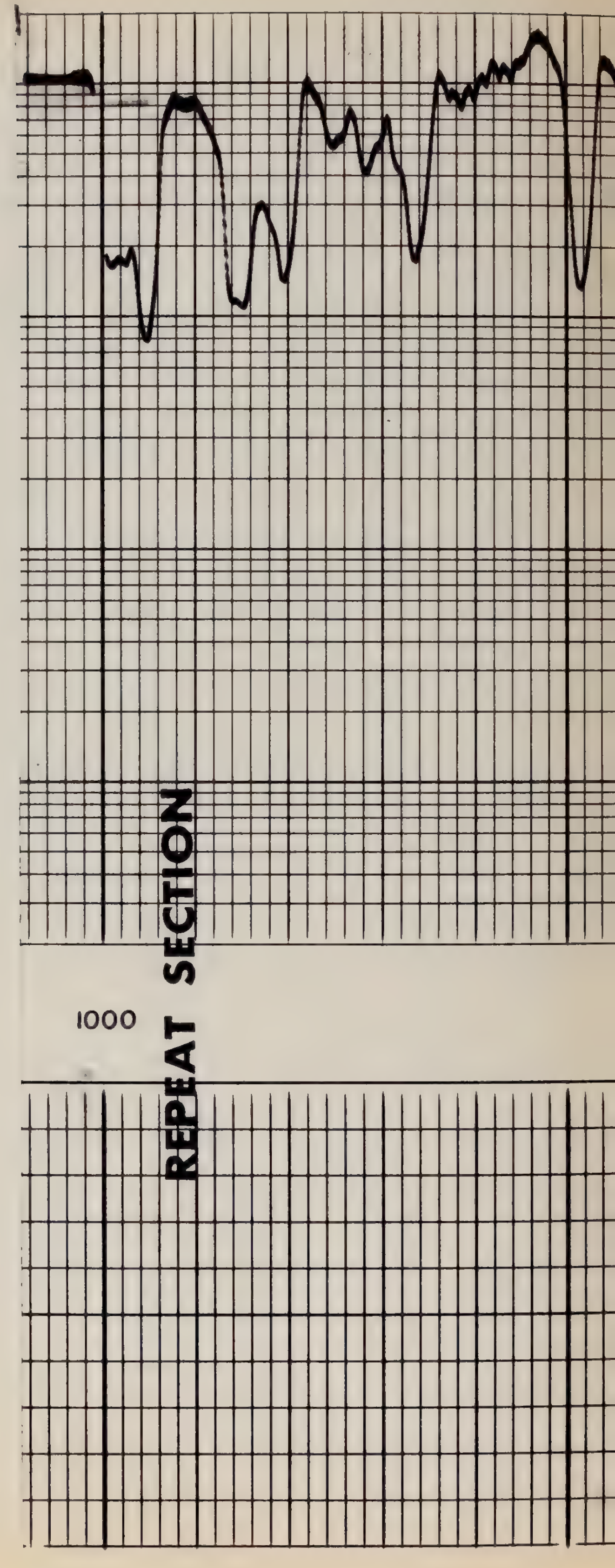
00
1000

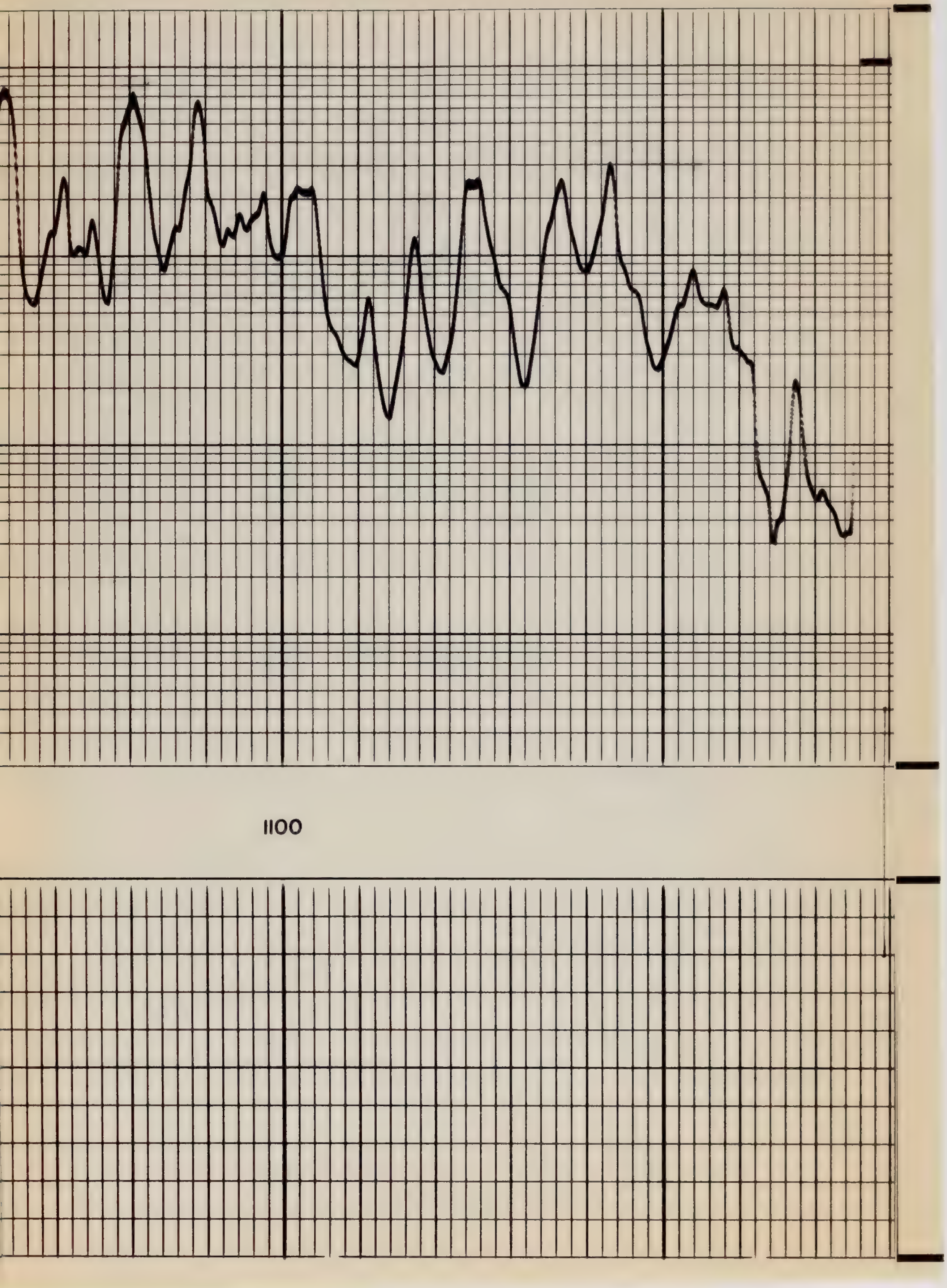



1100
dS






1000
REPEAT SECTION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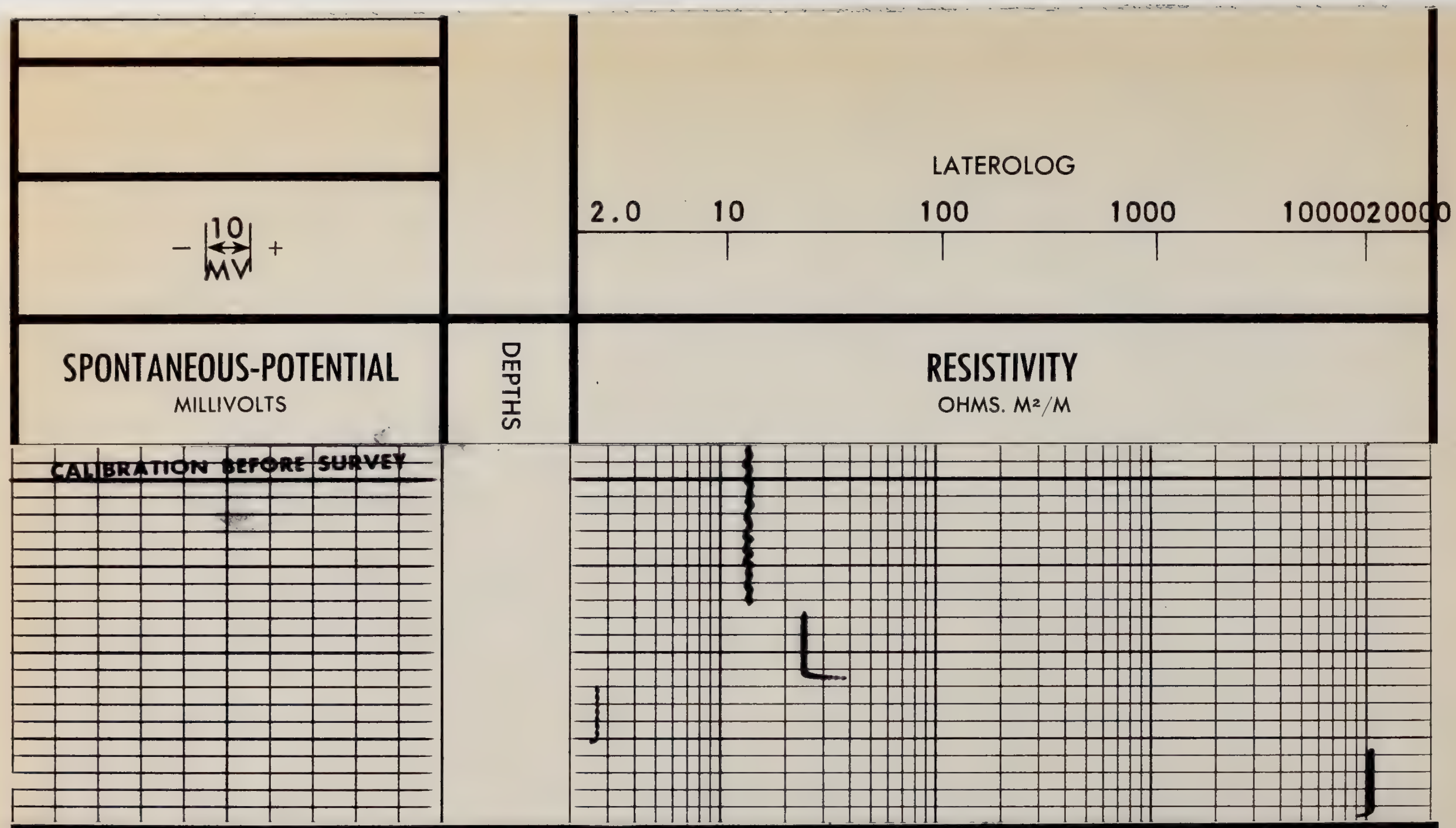


COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH 1-A

FIELD SORGHUM GULCH

SCHL. FR 1179
SCHL. TD 1182
DRLR TD 1180
Elev:
KB
DF

Schlumberger

BOREHOLE COMPENSATED SONIC LOG - GAMMA RAY

(WITH CALIPER)

COUNTY RIO BLANCO
FIELD or LOCATION SORGHUM GULCH
WELL SORGHUM GULCH 1-A
COMPANY ATLANTIC RICHFIELD

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH 1-A

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

Location:

Sec. 2 Twp. 3S Rge. 97W

Other Services:
TEMP.
FDC-GR
AMP-VDL, LL-7

Permanent Datum: GL ; Elev.:
Log Measured From GL , 0 Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B.
D.F.
G.L.

Date	2-1-75			
Run No.	ONE			
Depth—Driller	1180			
Depth—Logger	1182			
Btm. Log Interval	1180			
Top Log Interval	230			
Casing—Driller	7 @ 230	@	@	@
Casing—Logger	230			
Bit Size	6-1/4			
Type Fluid in Hole	FORMATION FLUID			
Fluid Level	Z 150			
Dens. / Visc.				
pH / Fluid Los	ml	ml	ml	ml
Source of Sample				
Rm @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
Rmf @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
Rmc @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
Source: Rmf / Rmc				
Rm @ BHT	@ °F	@ °F	@ °F	@ °F
Time Since Circ.				
Max. Rec. Temp.	°F	°F	°F	°F
Equip. / Location	5602 / GJ			
Recorded By	GEIGER			
Witnessed By	POWERS			

The well name, location and borehole reference data were furnished by the customer

FOLD HERE

CHANGES IN MUD TYPE OR ADDITIONAL SAMPLES

Date	Sample No.				
Depth - Driller					
Type Fluid in Hole					
Dens.	Visc.				
ph	Fluid Loss		ml		ml
Source of Sample					
R_m @ Meas. Temp.		@	°F	@	°F
R_{mf} @ Meas. Temp.		@	°F	@	°F
R_{mc} @ Meas. Temp.		@	°F	@	°F
Source: R_{mf}	R_{mc}				
R_m @ BHT		@	°F	@	°F
R_{mf} @ BHT		@	°F	@	°F
R_{mc} @ BHT		@	°F	@	°F

SCALE CHANGES

Type Log	Depth	Scale Up Hole	Scale Down Hole

EQUIPMENT DATA

Run No.	ONE			
Sonic Panel No.	JD-439			
Sonic Cart No.				
Sonic Sonde No.				
Mem. Panel No.				
G.R. Cart. No.				
G.R. Panel No.				
Caliper No				
TTR No.				
Cent. Device				
Stand off - Inches				
Time Const. - Sec.				
Speed - F.P.M.				

REMARKS

Service Order No. - 22443

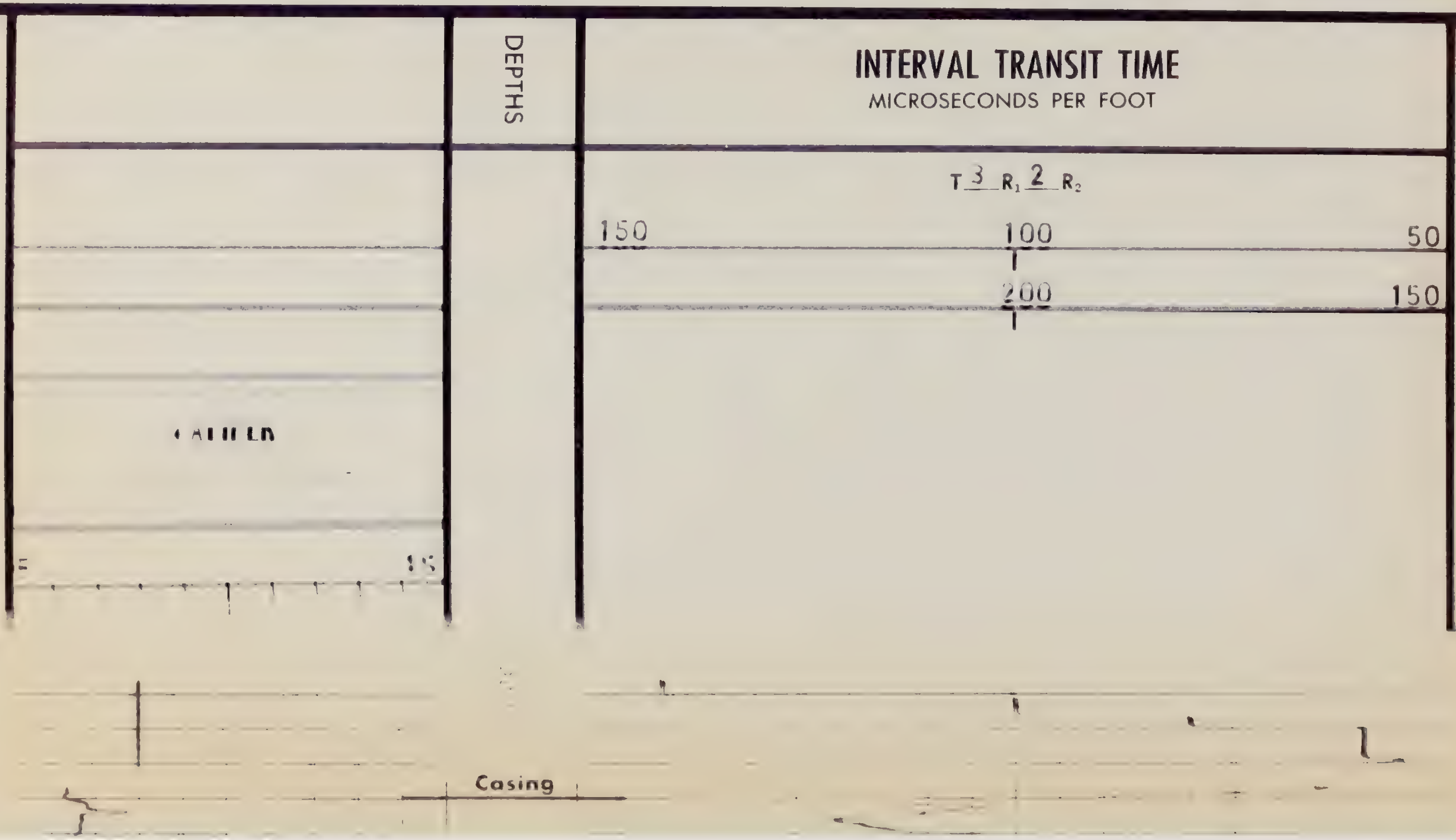
API Serial No. -

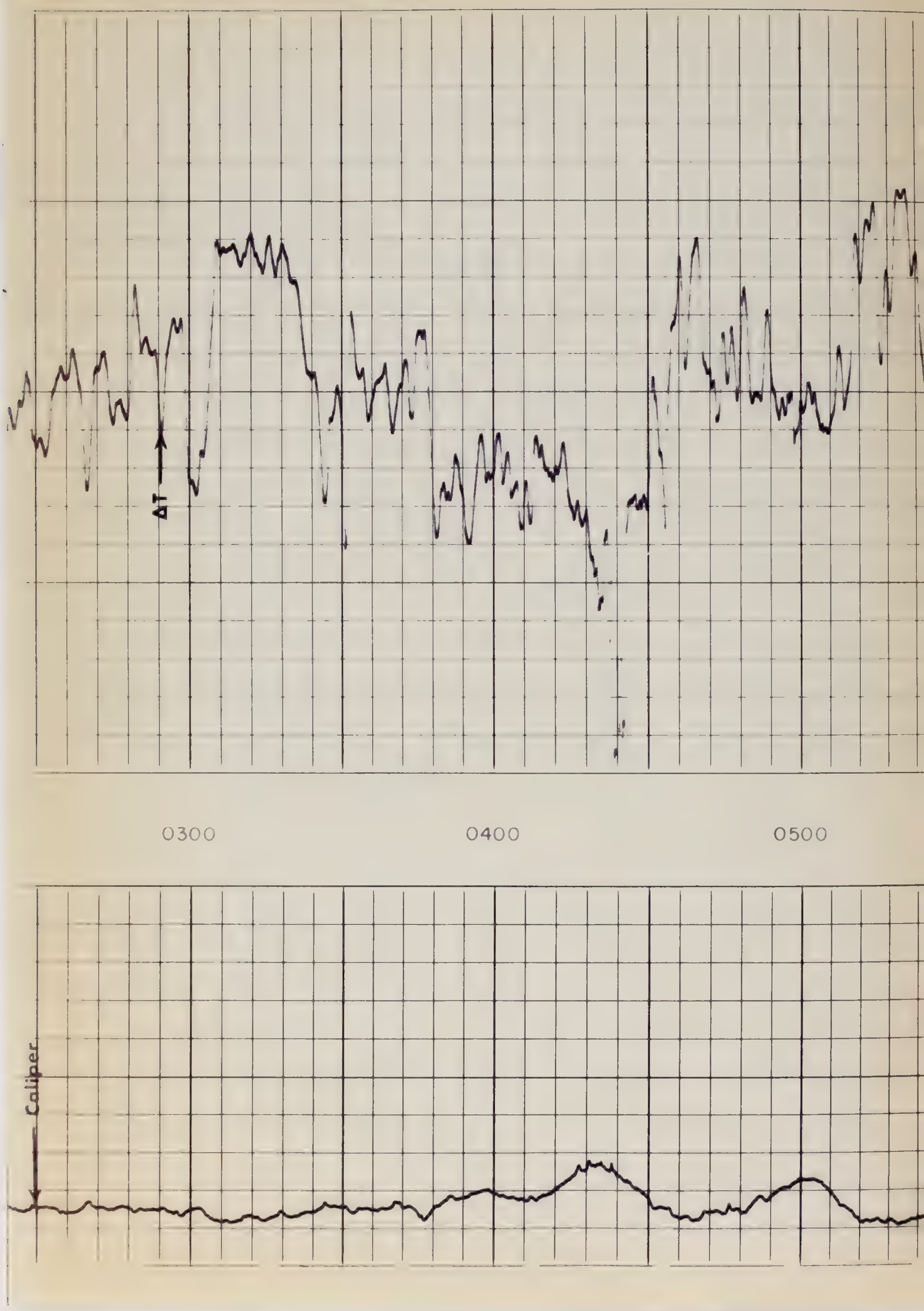
GR NO RECORDED ON BHC
BECAUSE OF LIMITATIONS ON PICKING UP
TOOLS IN THE SHORT RIG.

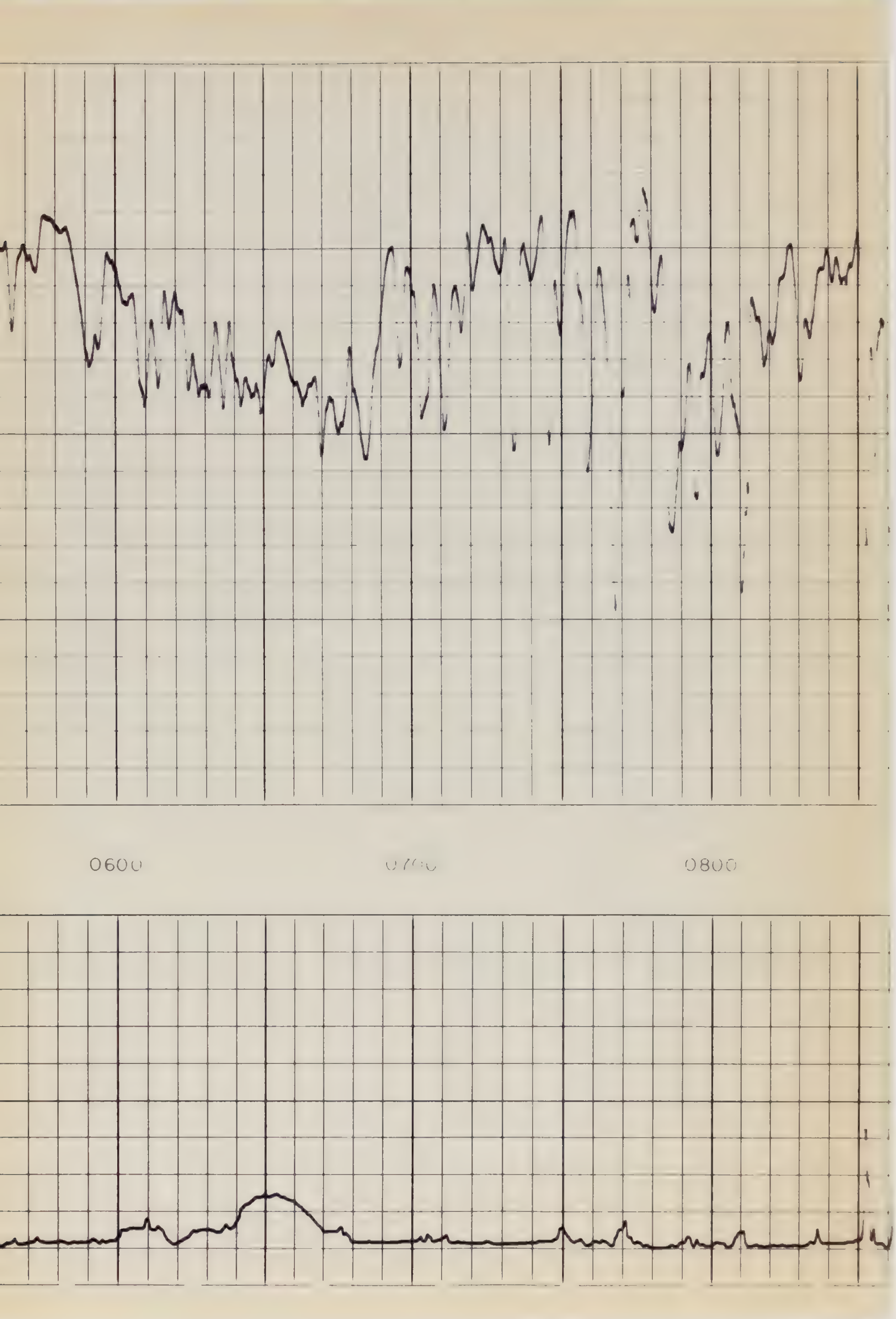
CALIBRATION DATA

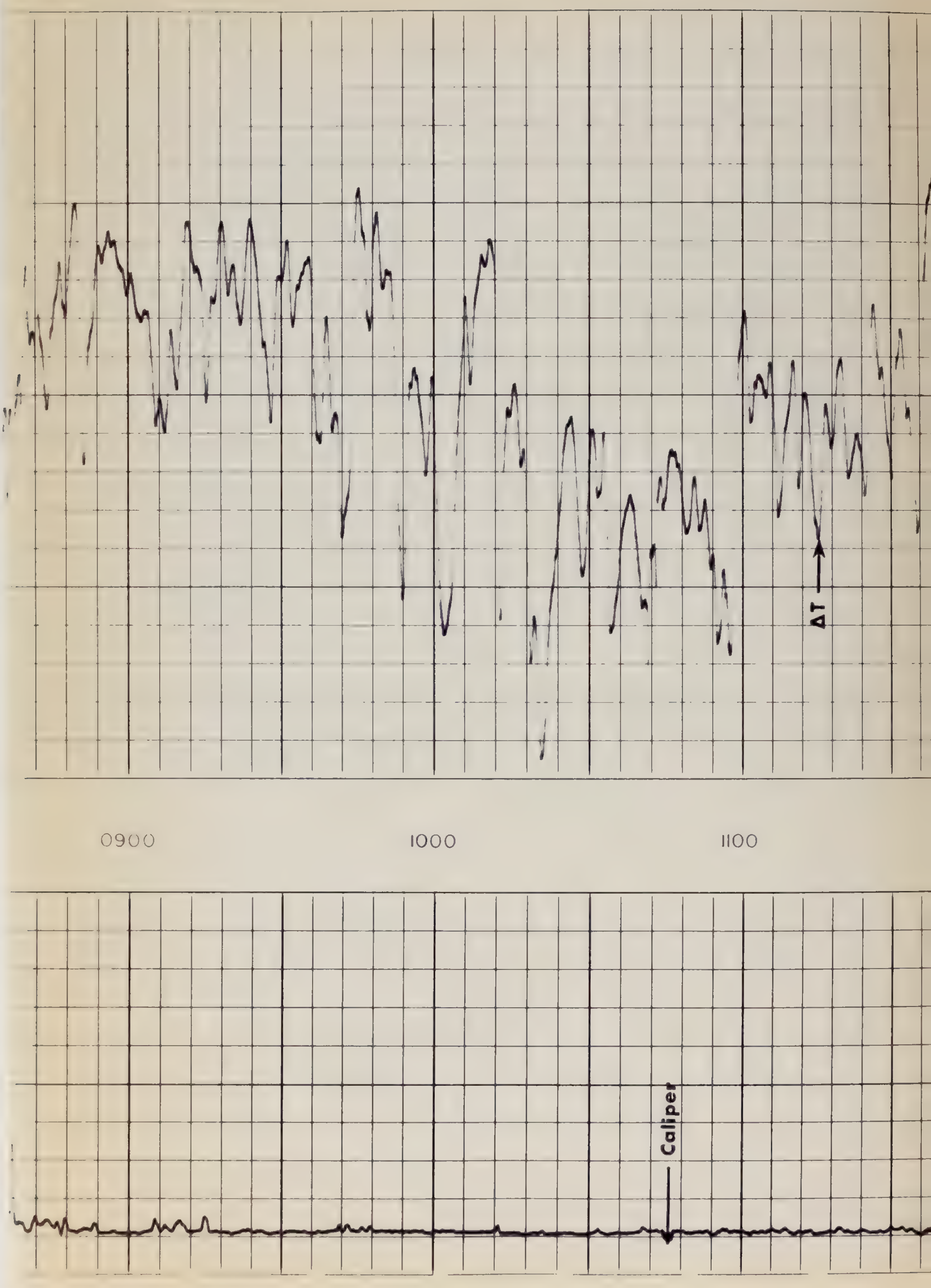
GAMMA RAY:

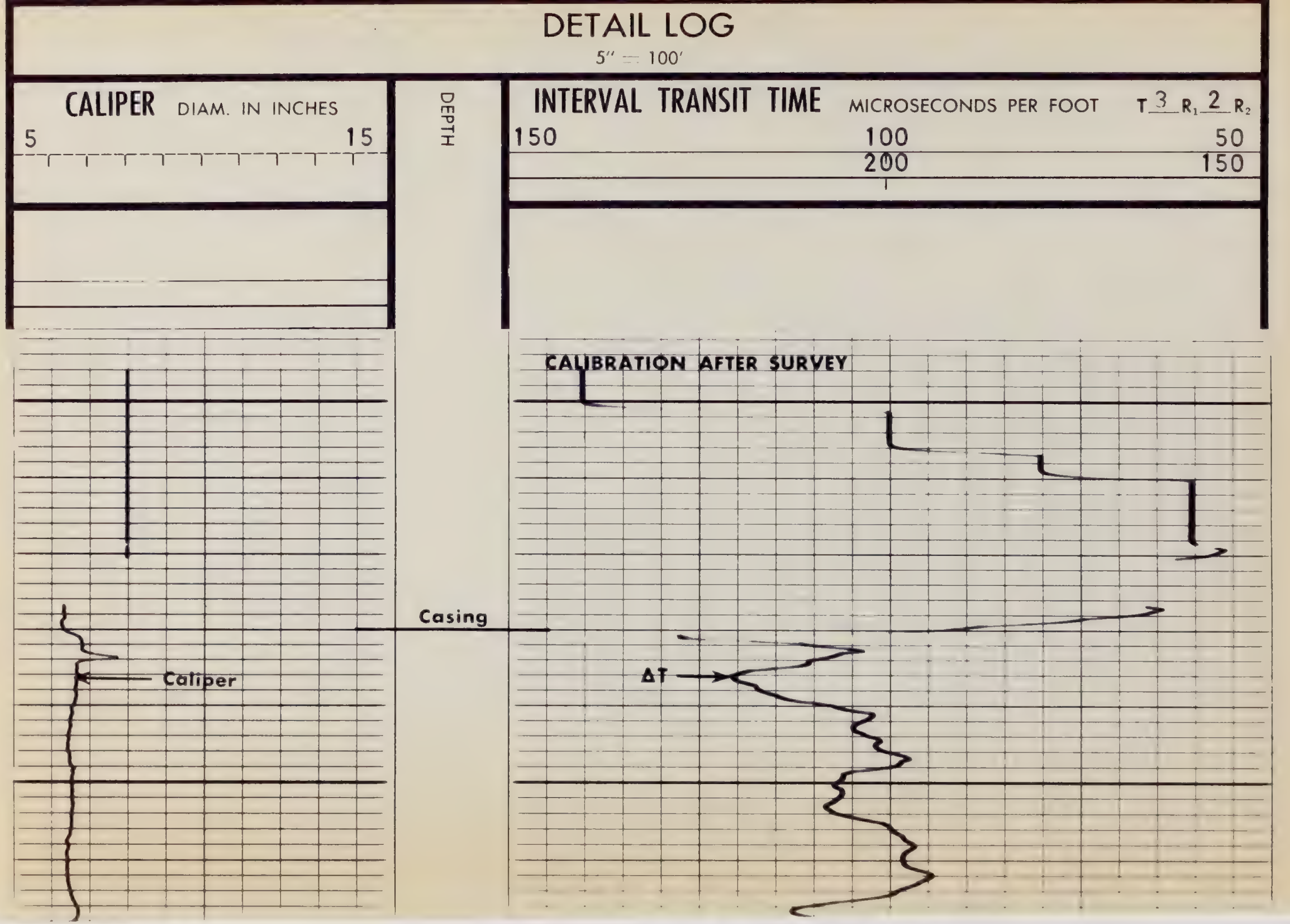
All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to Clause 7 of our General Terms and Conditions as set out in our current Price Schedule.

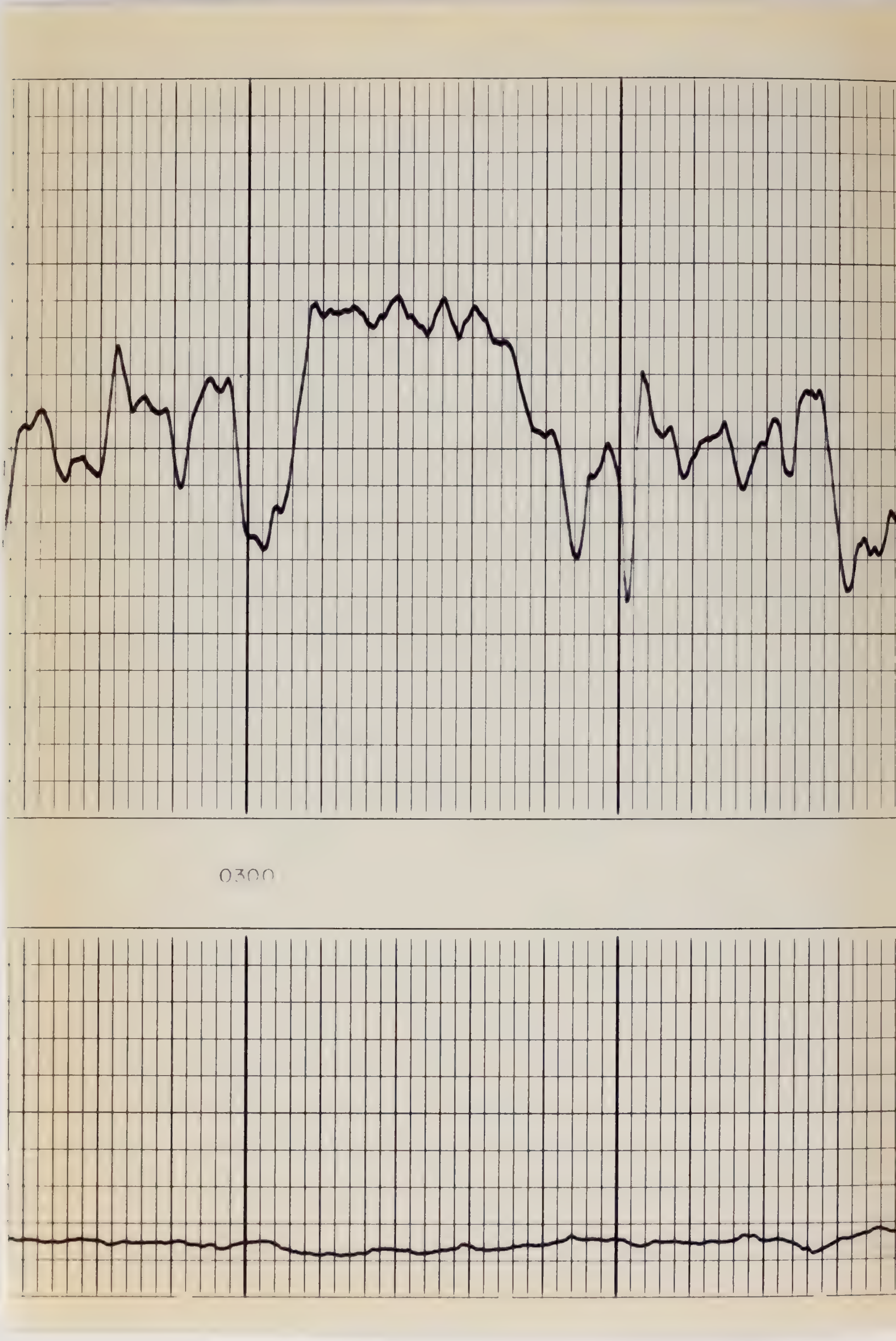



ΔT
0300
0400
0500
Caliper


0600
0700
0800


ΔT
0900
1000
1100
Caliper


DETAIL LOG
5″ = 100′
CALIPER DIAM. IN INCHES
5
15
DEPTH
INTERVAL TRANSIT TIME MICROSECONDS PER FOOT
T 3 R₁ 2 R₂
150
100
50
200
150
CALIBRATION AFTER SURVEY
Casing
Caliper
ΔT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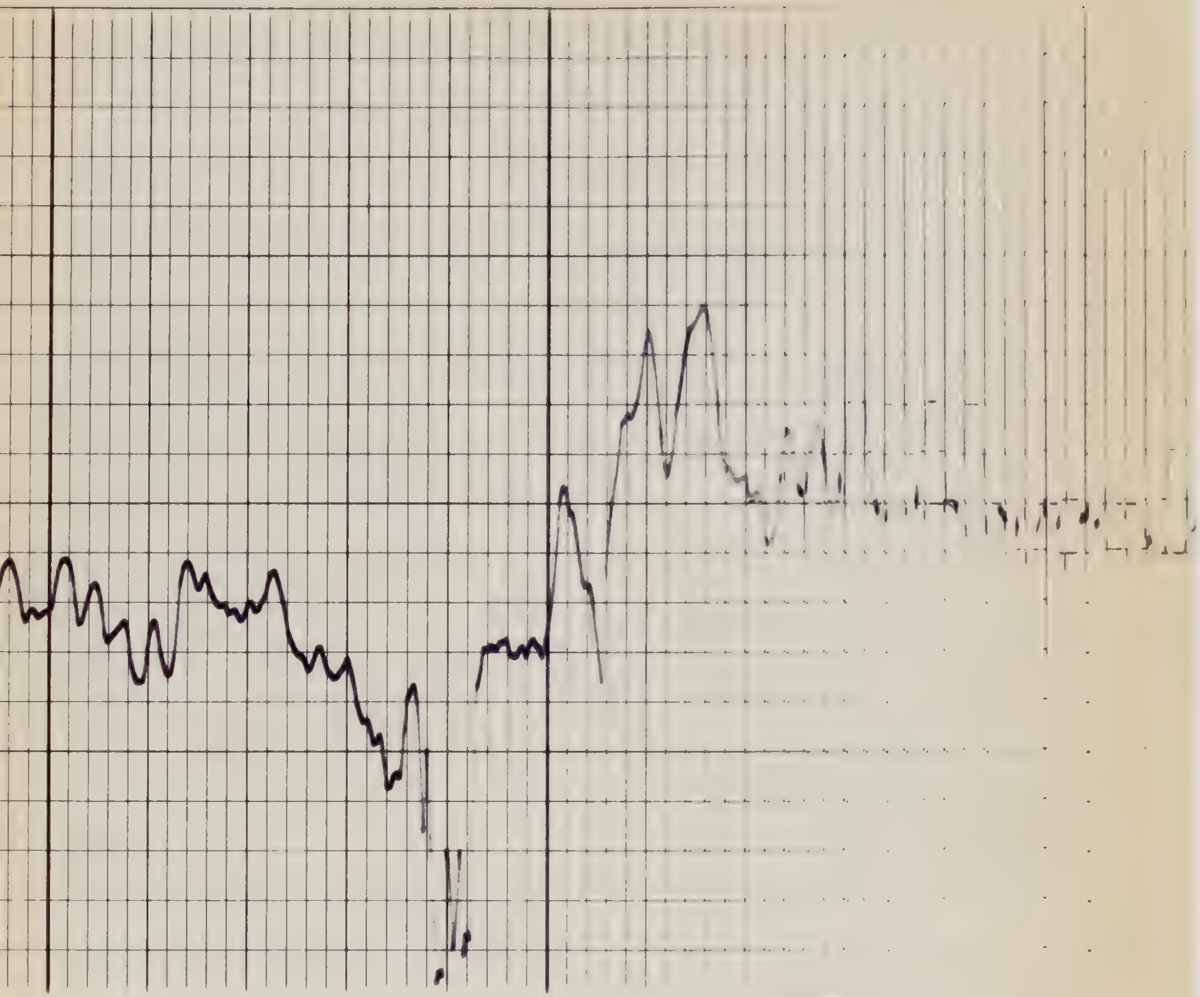

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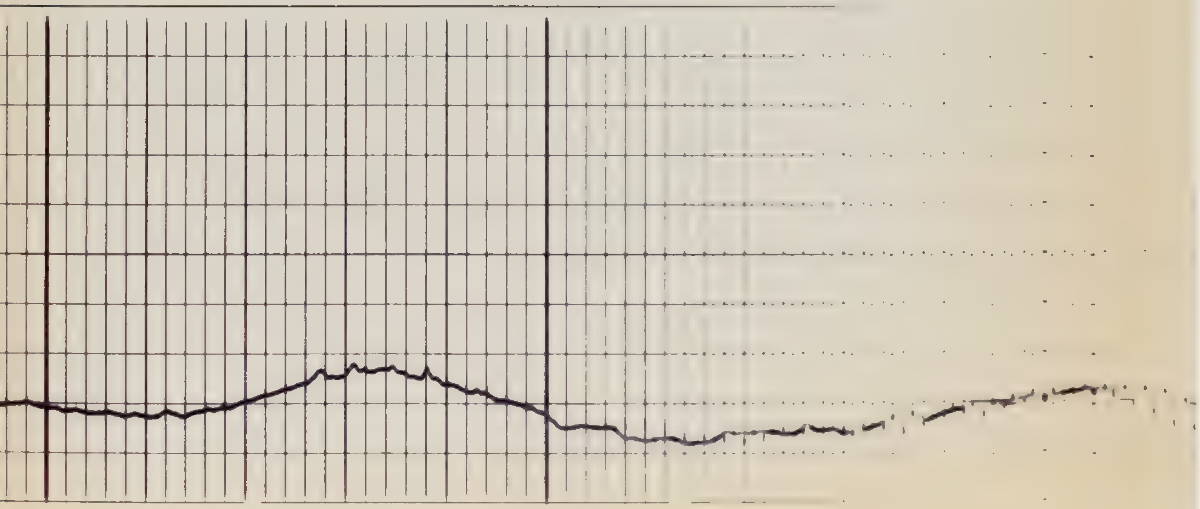

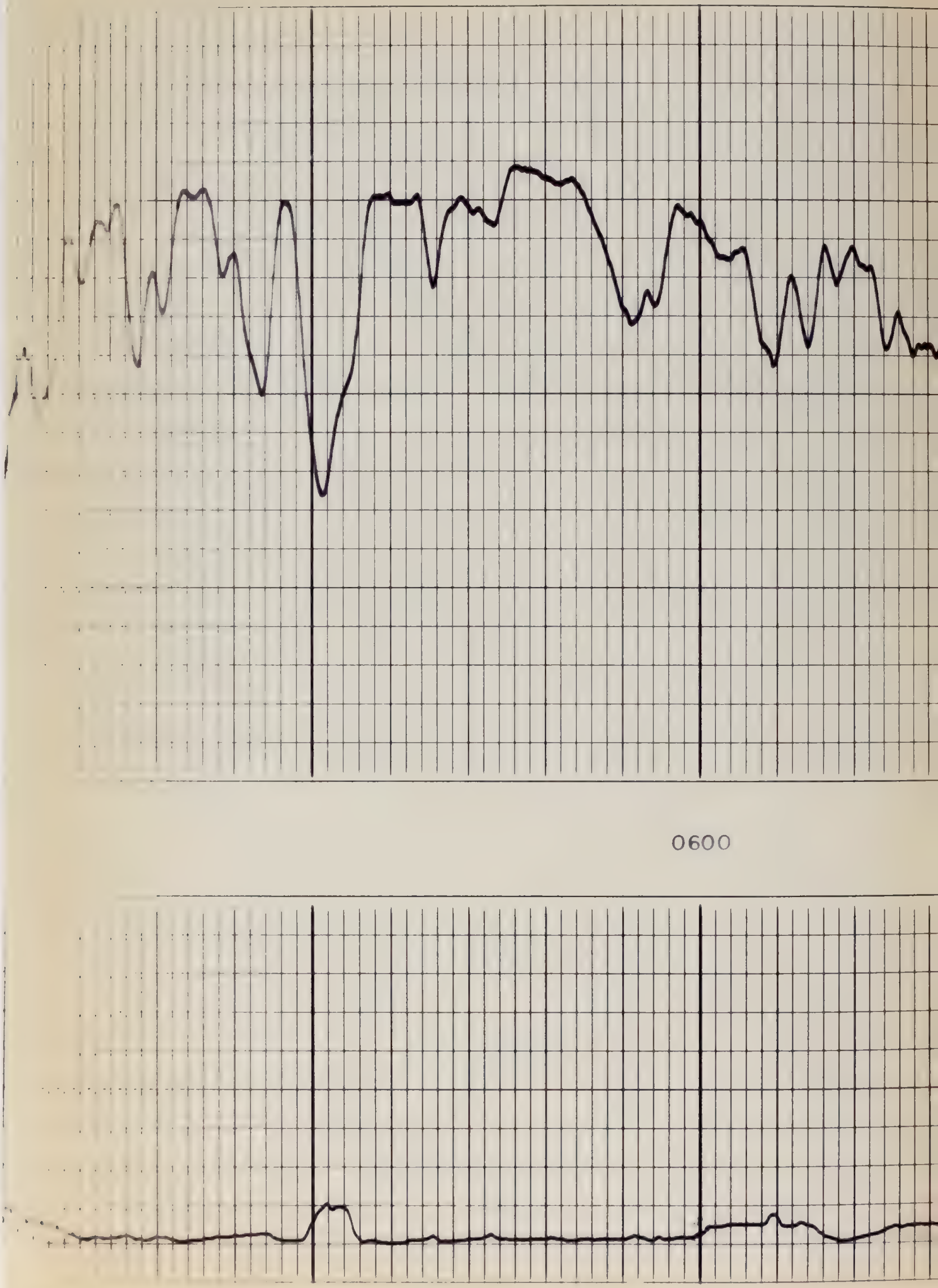
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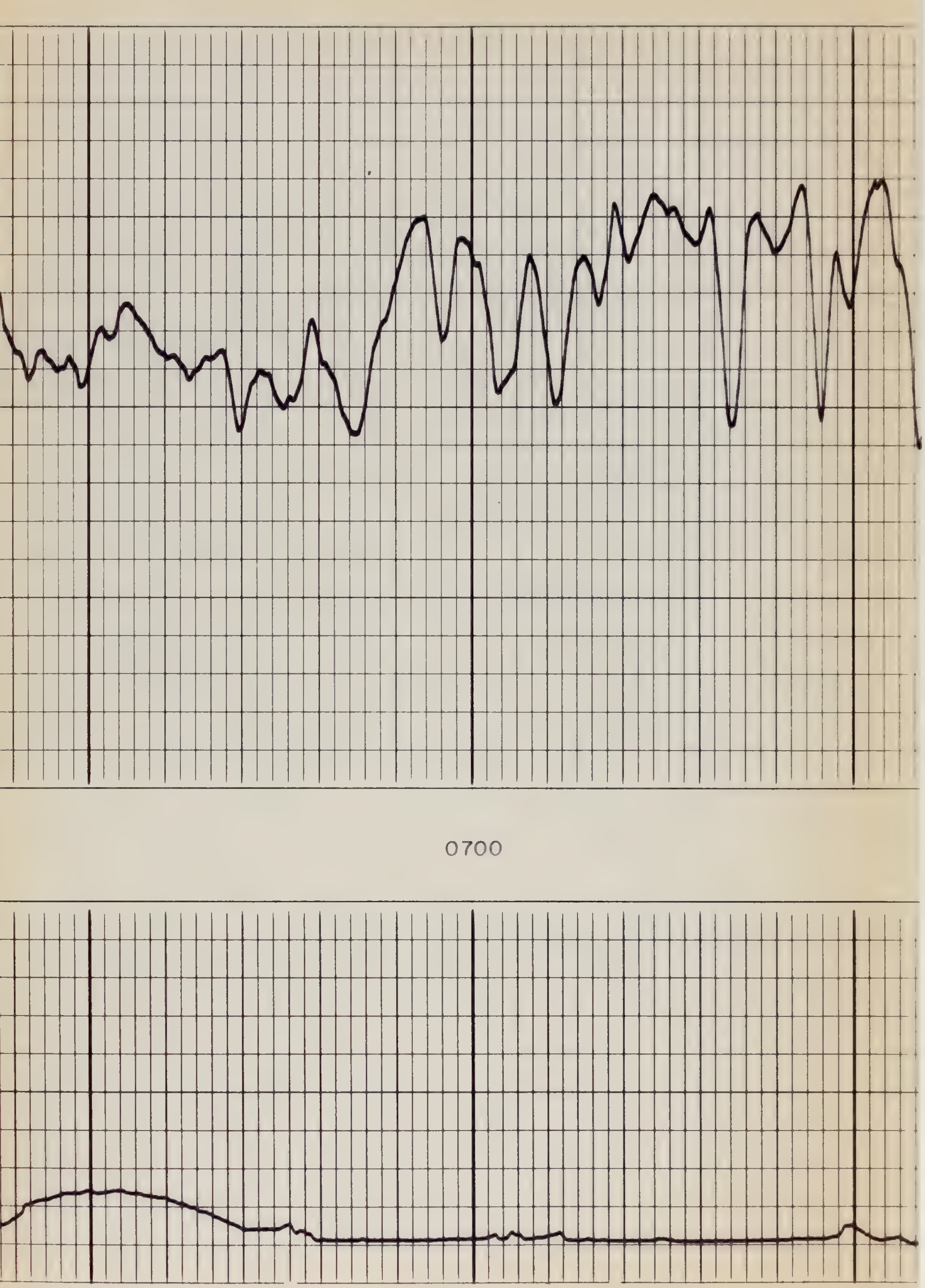
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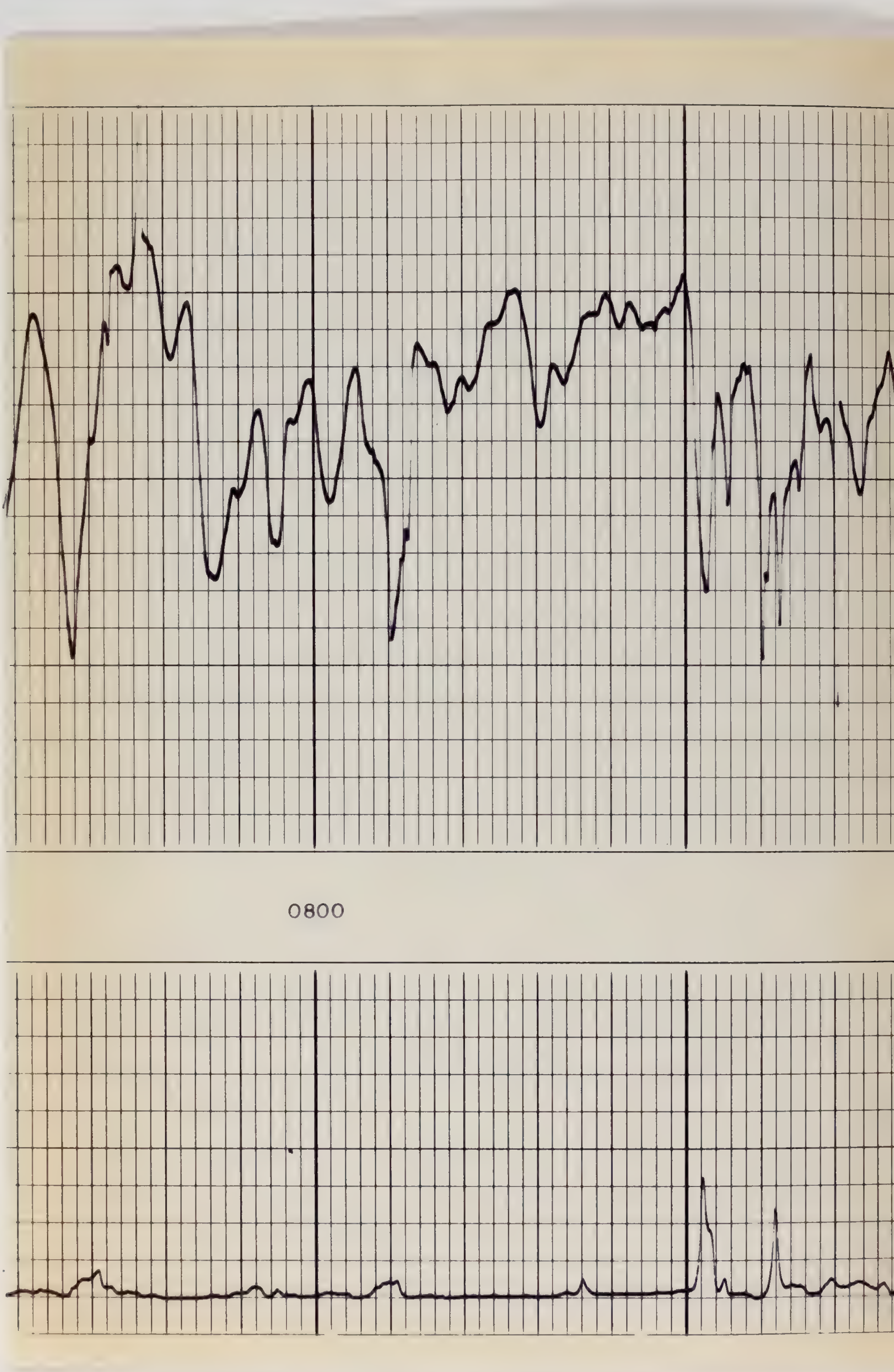
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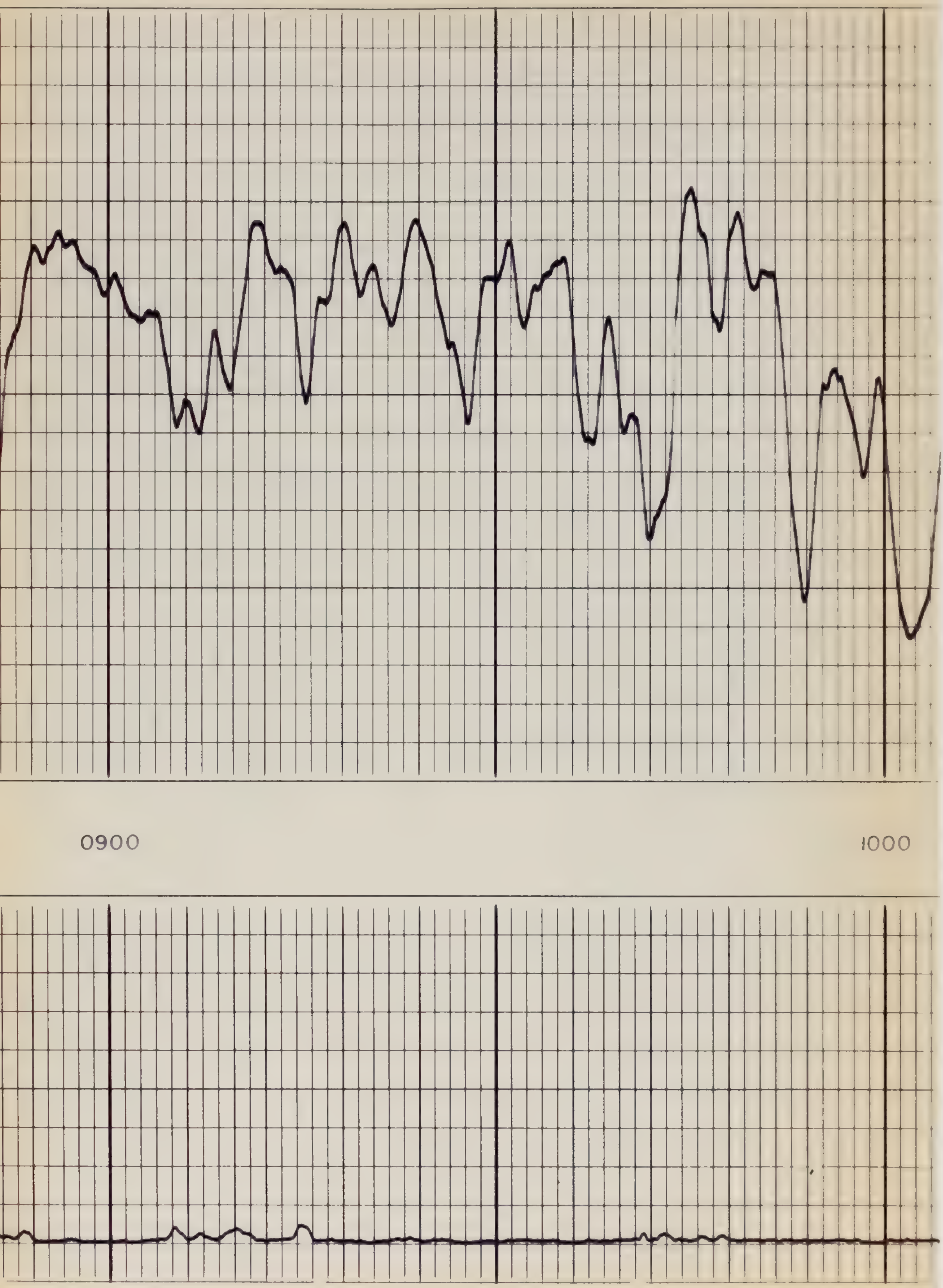
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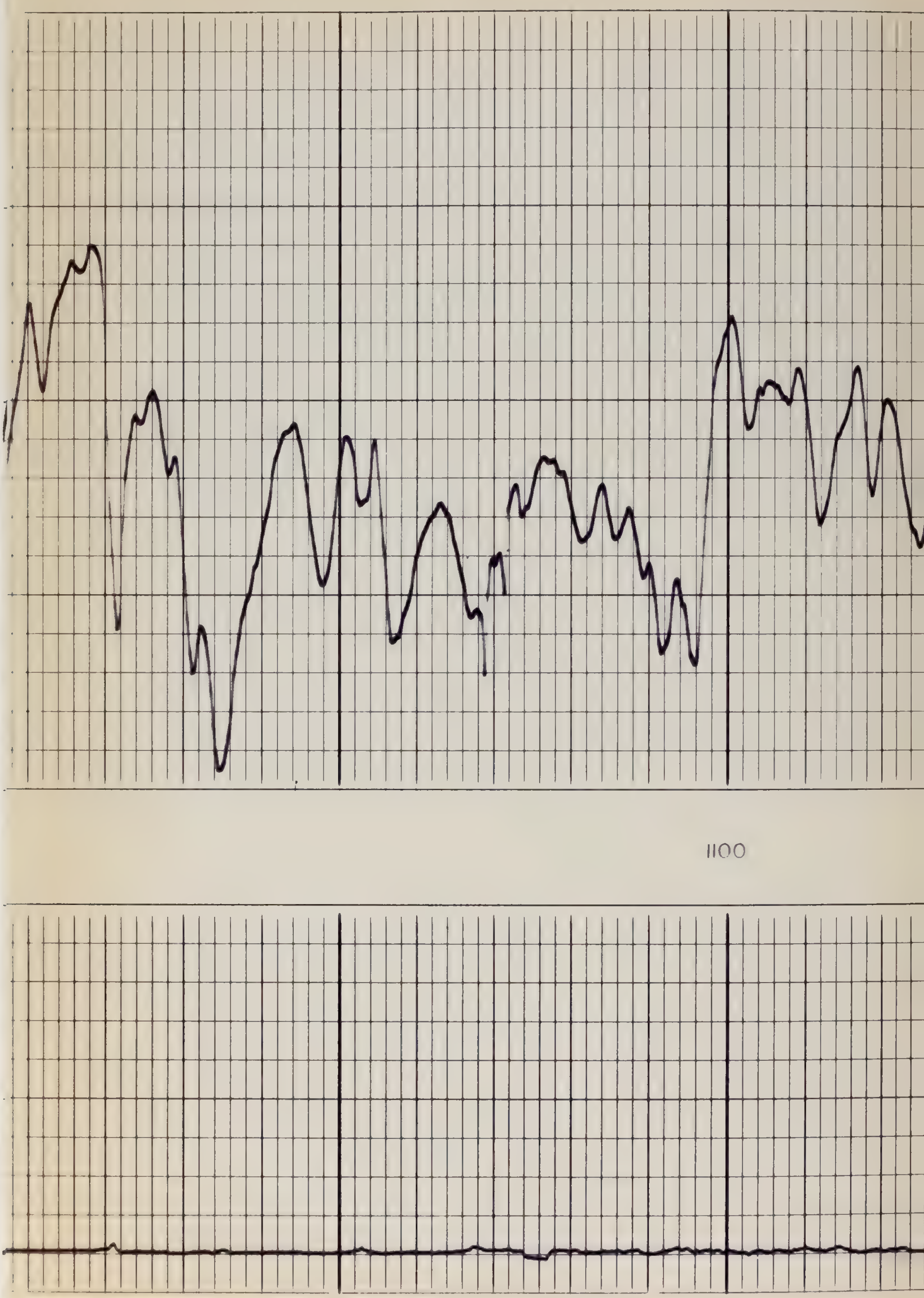
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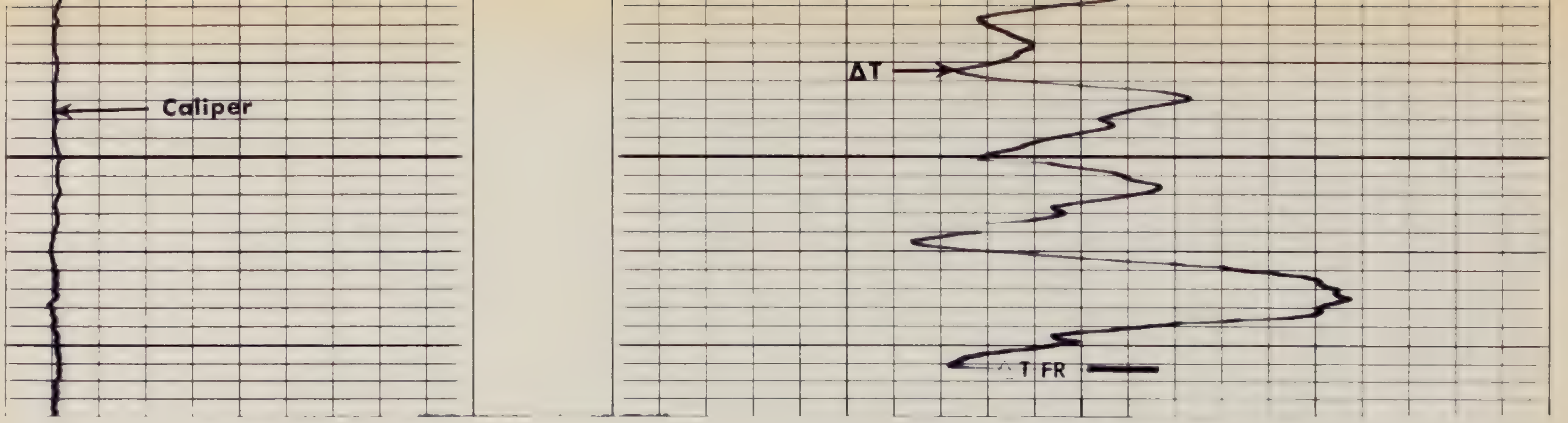
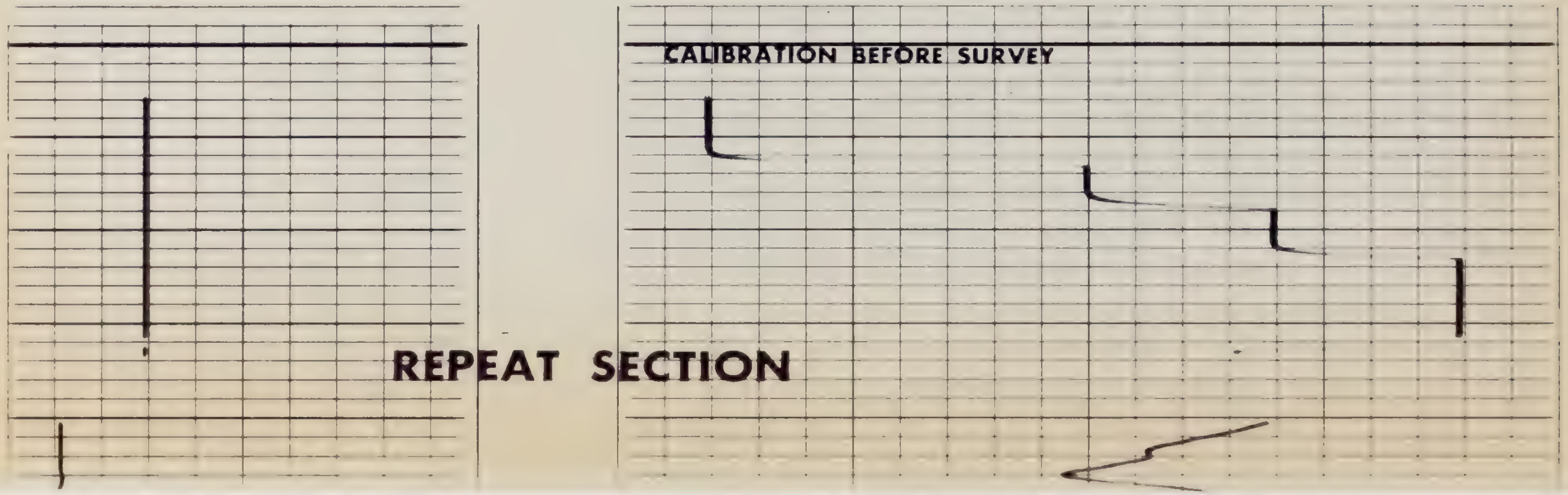
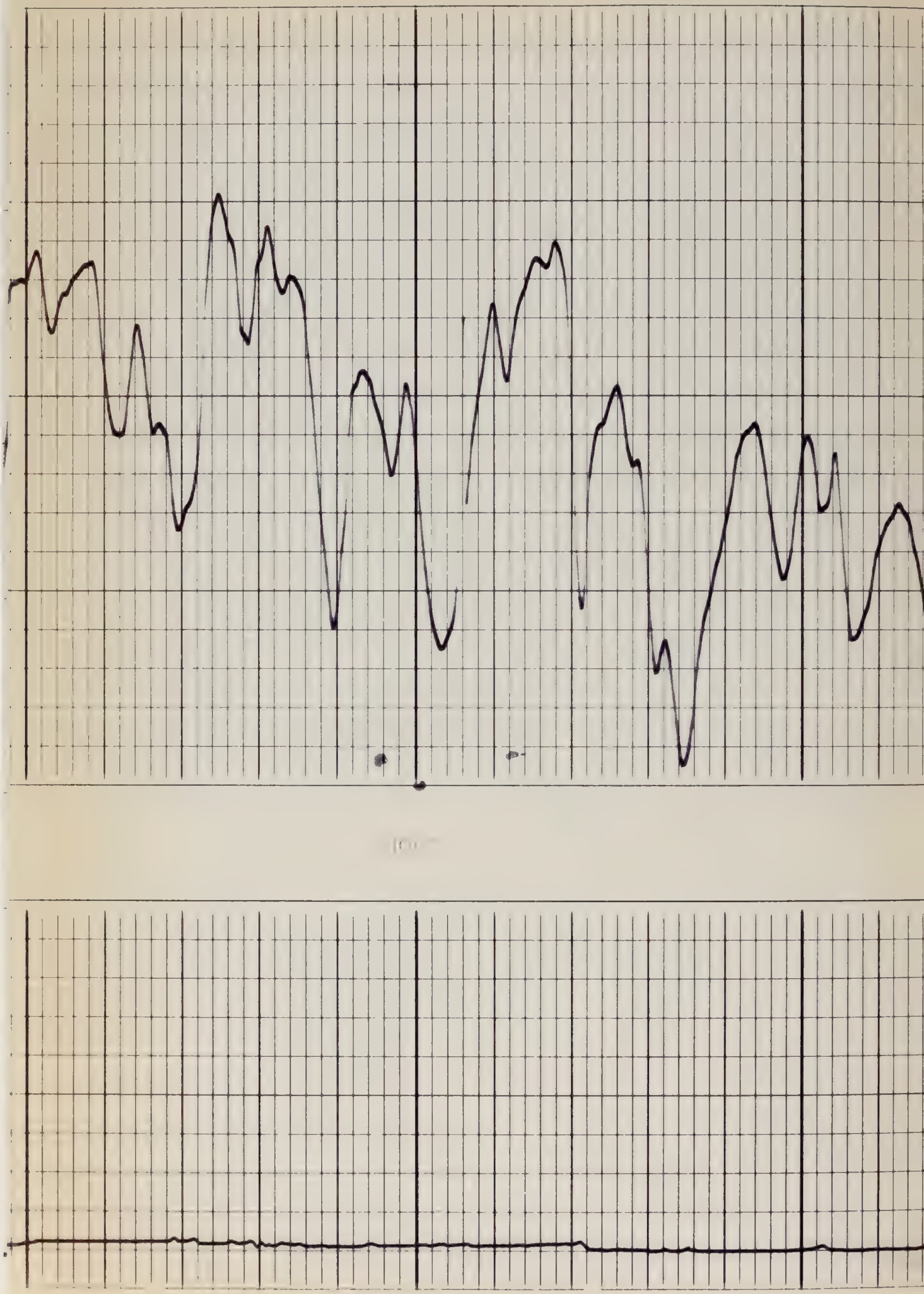
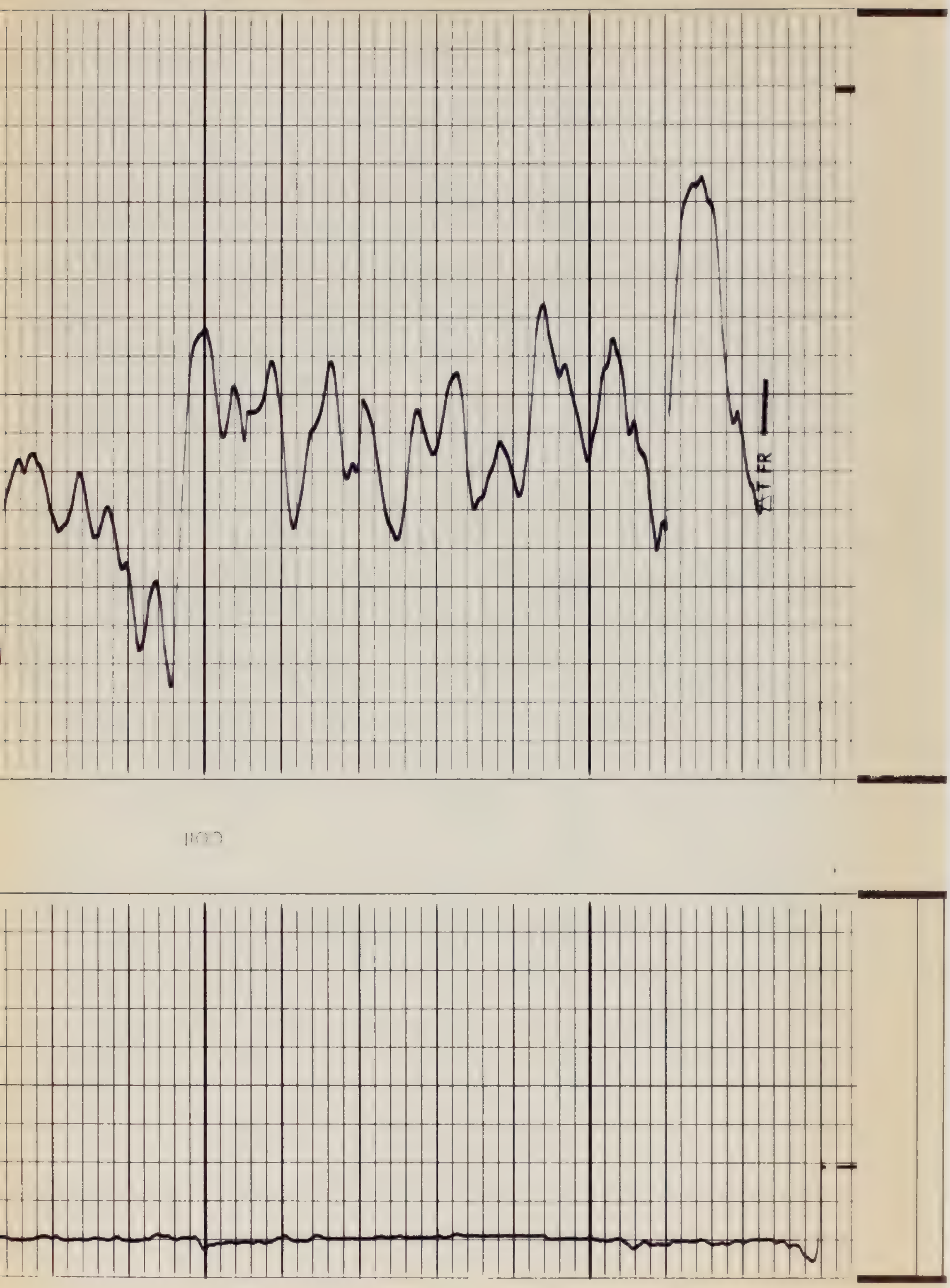

Caliper
ΔT
ΔT FR


CALIBRATION BEFORE SURVEY
REPEAT SECTION




TFR
1100

CALIPER DIAM. IN INCHES 5 15	DEPTH	**INTERVAL TRANSIT TIME** MICROSECONDS PER FOOT T 3 R₁ 2 R₂ 150 100 50 200 150

BOREHOLE COMPENSATED SONIC CALIBRATION CODING

1. MECHANICAL ZERO
2. 40 μ SEC/FT
3. 60 μ SEC FT
4. 80 μ SEC FT
5. 100 μ SEC FT
6. 140 μ SEC FT

CALIBRATION RECORD

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH 1-A

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 1180
SCHL. TD 1182
DRLR TD 1180

Elev: KB
DF
GL

Schlumberger

COMPENSATED FORMATION DENSITY LOG

Gamma-Gamma

COUNTY RIO BLANCO
FIELD or LOCATION SORGHUM GULCH
WELL SORGHUM GULCH 1-A
COMPANY ATLANTIC RICHFIELD

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH 1-A

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

Location: API Serial No.

Sec. 2 Twp. 3S Rge. 97W

Other Services:
BHC
TEMP
LL-7 AMP.

Permanent Datum: GL ; Elev.:
Log Measured From GL , Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B.
D.F.
G.L.

Date	1/20/75	2-1-75		
Run No.	ONE	TWO		
Depth—Driller	938	1180		
Depth—Logger	938	1182		
Btm. Log Interval	937	1181		
Top Log Interval	80	700		
Casing—Driller	7" @ 225	7 @225	@	@
Casing—Logger	230	230		
Bit Size	6-1/4	6-1/4		
Type Fluid in Hole	WATER	FORMATION WATER		
Fluid Level	150'	200		
Dens. | Visc.				
pH | Fluid Los	ml	ml	ml	ml
Source of Sample	PIT			
R_m @ Meas. Temp.	7.6 @ 61 °F	@ °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
R_{mc} @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
Source: R_{mf} | R_{mc}				
R_m @ BHT	@ °F	@ °F	@ °F	@ °F
Time Since Circ.		5. HRS.		
Max. Rec. Temp.	6 °F	80 °F	°F	°F
Equip. | Location	5602 | G. J.	5602 | GJ		
Recorded By	GEIGER	GEIGER		
Witnessed By	BURNS	POWERS		

FOLD HERE The well name, location and borehole reference data were furnished by the customer.

CHANGES IN MUD TYPE OR ADDITIONAL SAMPLES

Date	Sample No.			
Depth - Driller				
Type Fluid				
Source of Sample				
R_m @ Meas. Temp.	@ °F		@ °F	
R_{mf} @ Meas. Temp.	@ °F		@ °F	
R_{mc} @ Meas. Temp.	@ °F		@ °F	
R_m @ BHT	@ °F		@ °F	
Dens.	Visc.			
ph	Fluid Loss	ml		ml
% Water by Vol.				
% Oil by Vol.				
% Solids by Vol.				
Solids Av. Sp. Gr.				

SCALE CHANGES

Type Log	Depth	Scale Up Hole	Scale Down Hole

EQUIPMENT DATA

Run No.	ONE	TWO		
Panel No.	169	169		
Cart No.	299	299		
Skid No.	436	436		
Sonde No.	90	90		
Source	3098	3098		
Calibrator	210	210		
GR Cart.	209	289		
TTR				
Mem Panel	235	238		

LOGGING DATA

FDC Selectors

Liquid Density	Grain Density	Hole Fluid	Porosity Scale	From	To

REMARKS

Service Order No. - 22497

ELEVATION AND EXACT LOCATION WERE
NOT AVAILABLE AT TIME OF LOGGING.

RUN TWO: NO HOLE FLUID AVAILABLE
FOR SAMPLE

BIT SIZE/CASING DATA

Bit	From	To	Csg. Size	Csg. Wt.	From	To
6-1/4	150	938	7"	20#	SURF	225
6-1/4	230	1180	7"		SURF	230

CALIBRATION DATA

Run No.	Gamma Ray			FDC — Before Log — ACPS		FDC — After Log — ACPS	
	API Scale	Background CPS	Total CPS	P_1	P_2	P_1	P_2
1	0-200	150	610	550	930	545	930
2	0-200	160	630	550	925	550	925
3							
4				BLOCK CAL	560	940	

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CALIPER

HOLE DIAM. IN INCHES

5 15

DEPTHS

−.25 0 +.25

CORRECTION

GRAMS/CC.

GAMMA RAY

API UNITS

0 150

150 300

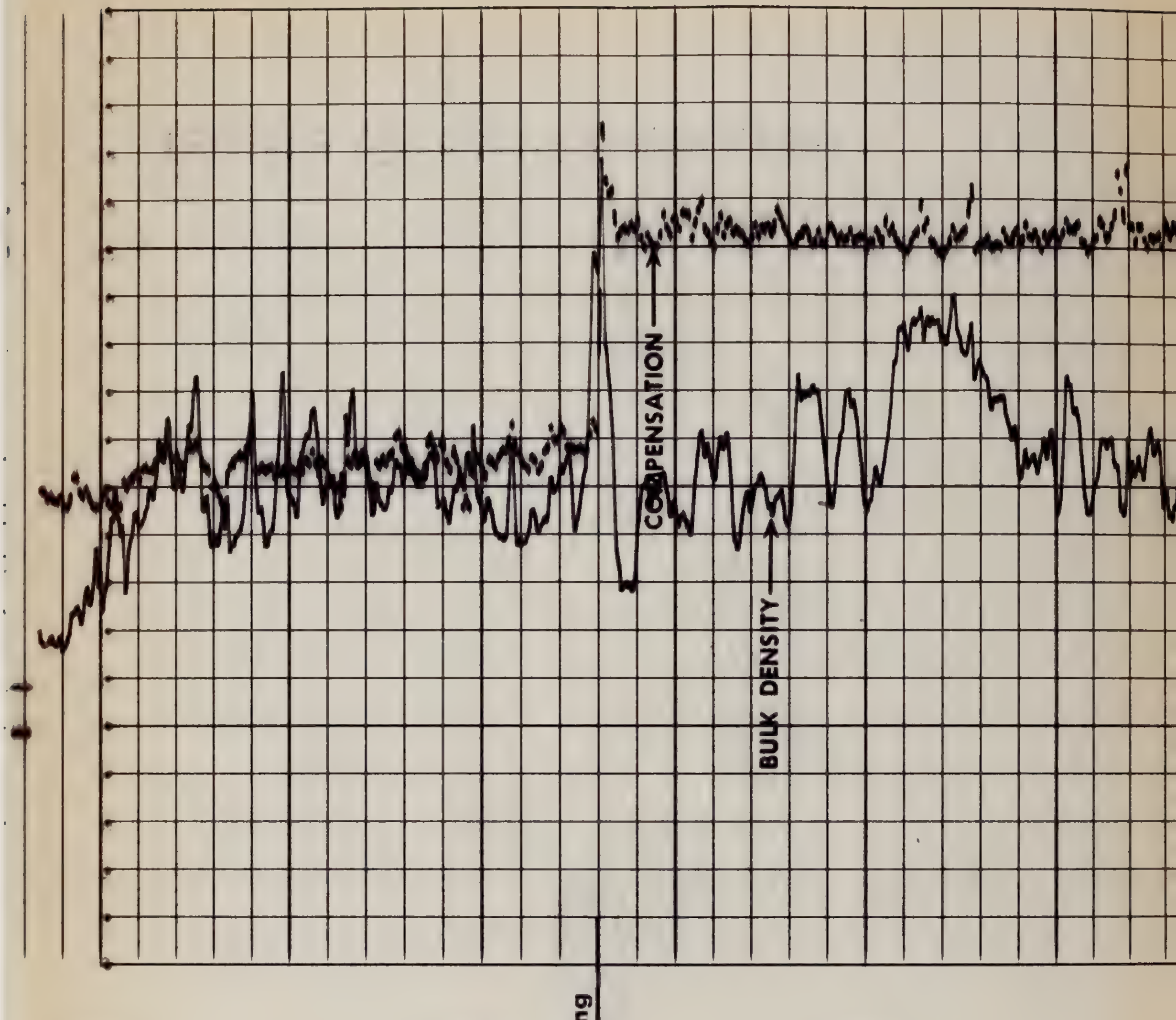
BULK DENSITY

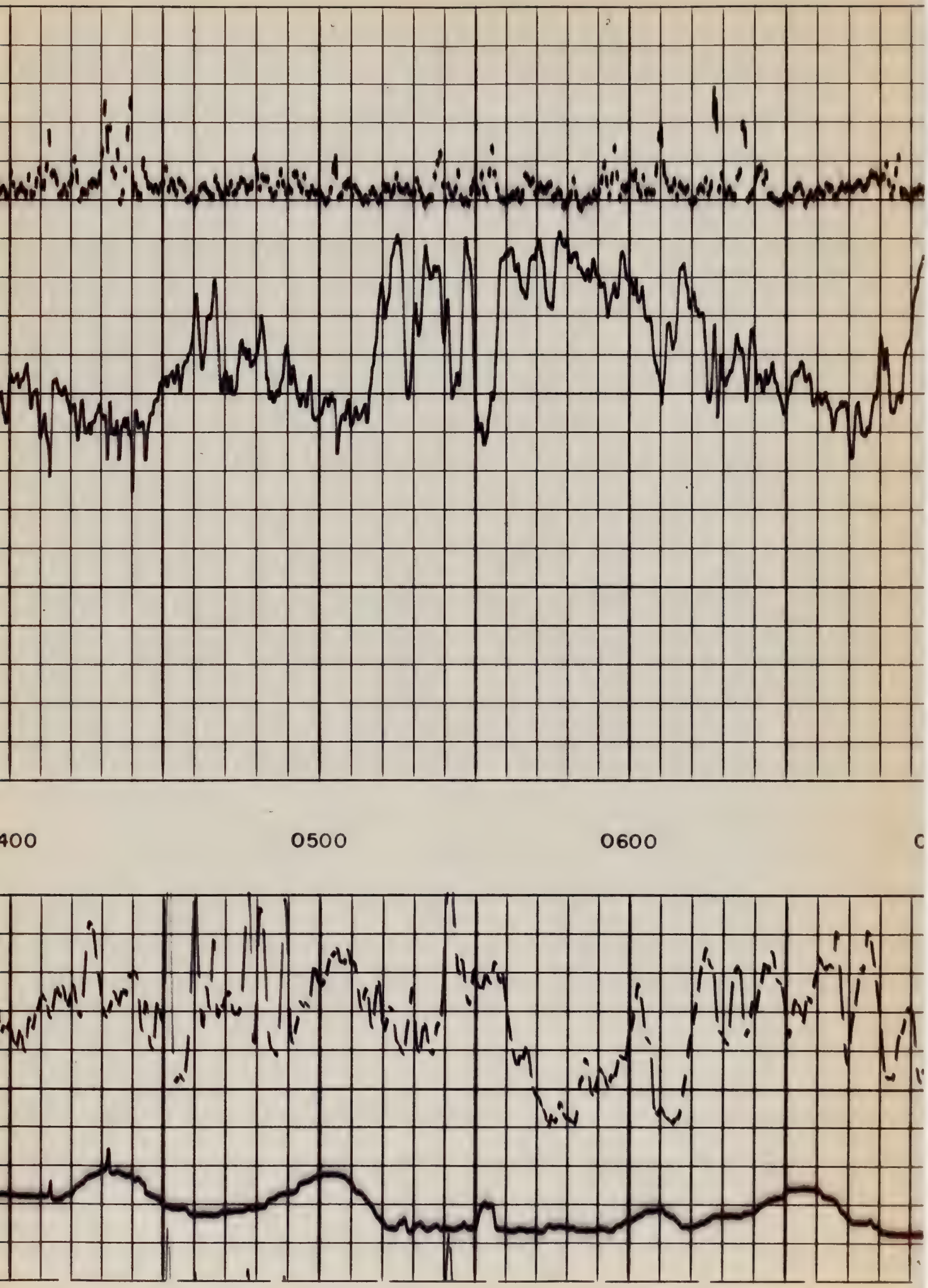
GRAMS CC.

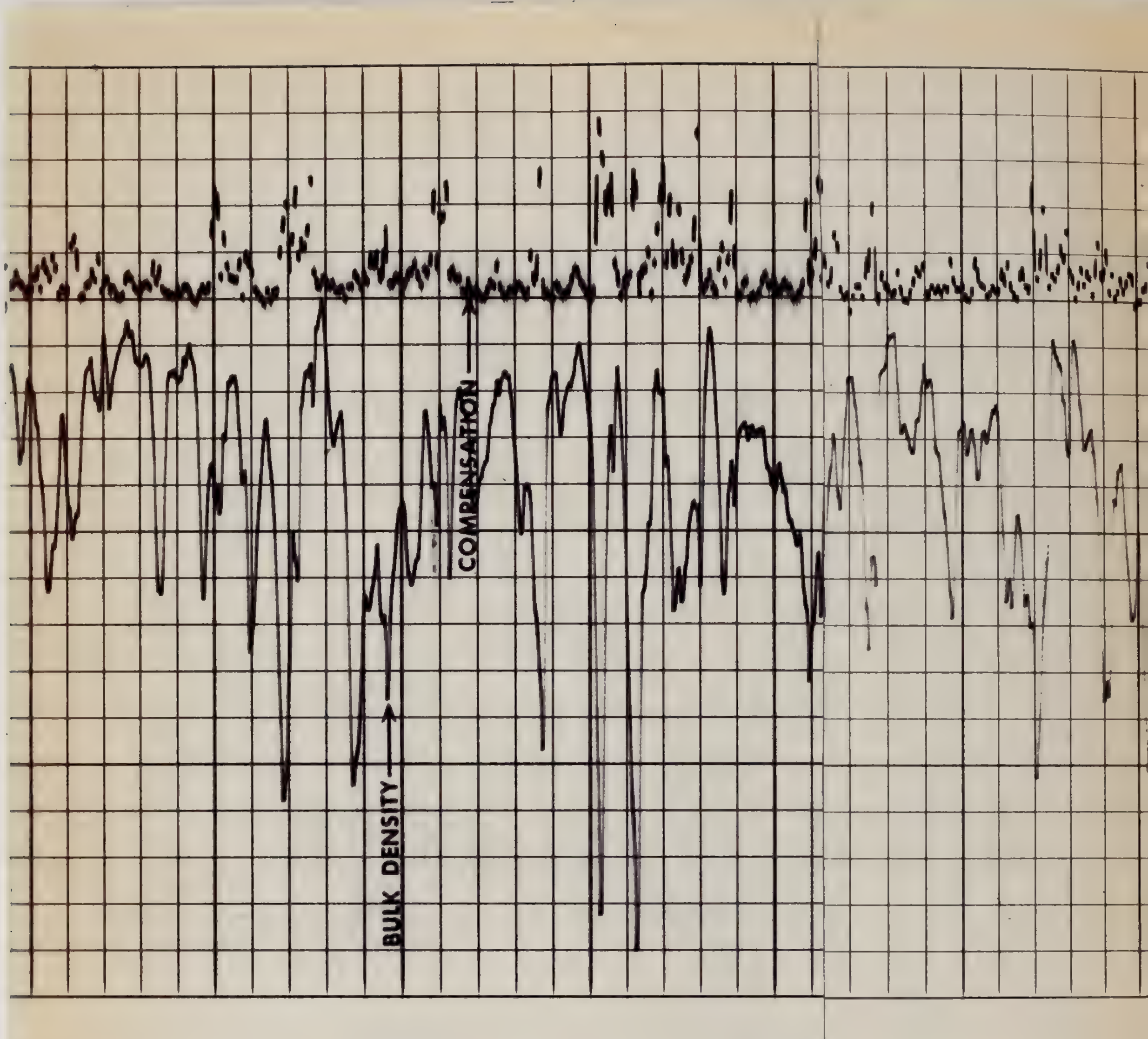
1.7 2.2 2.7

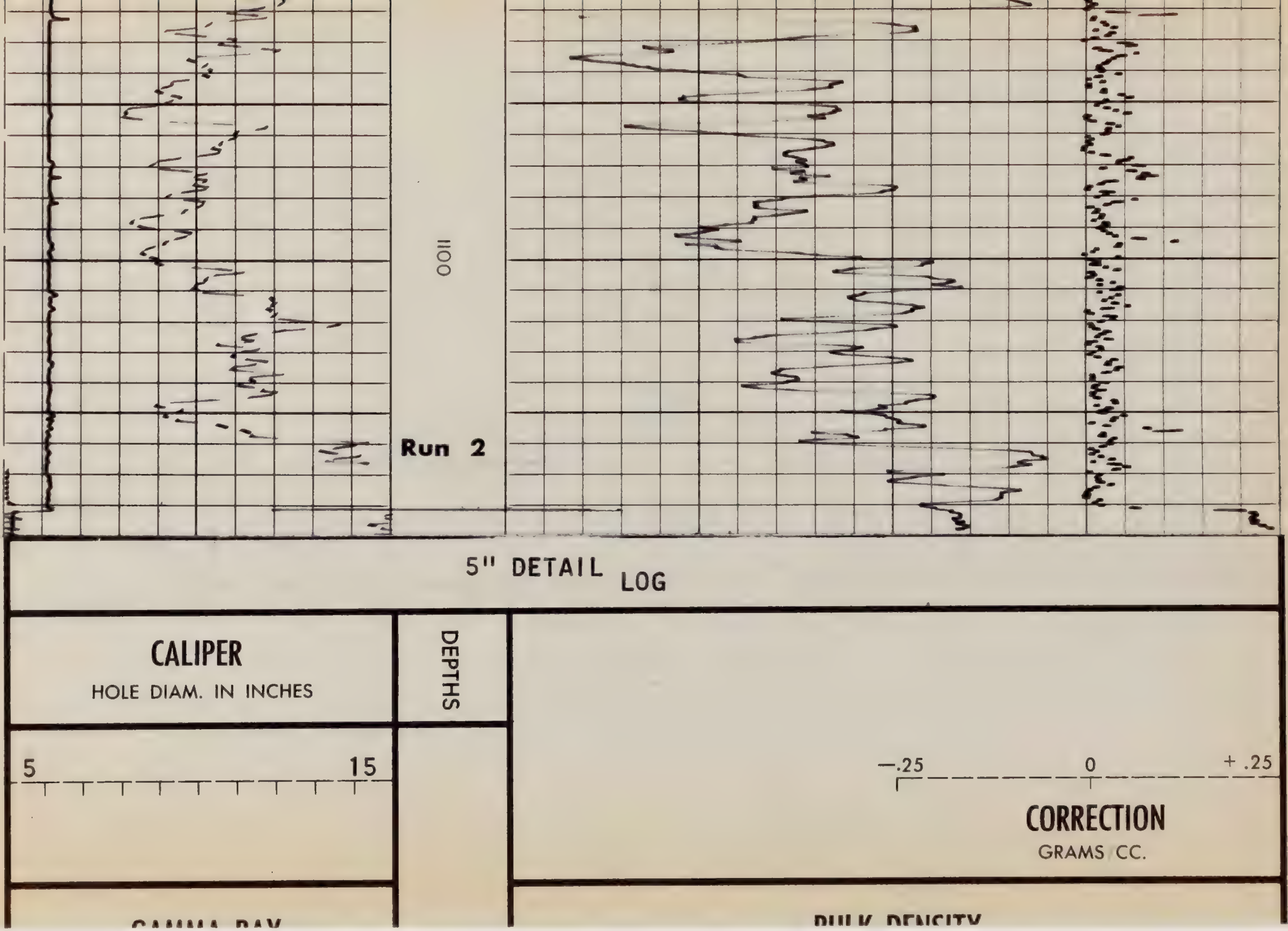
.7 1.2 1.7

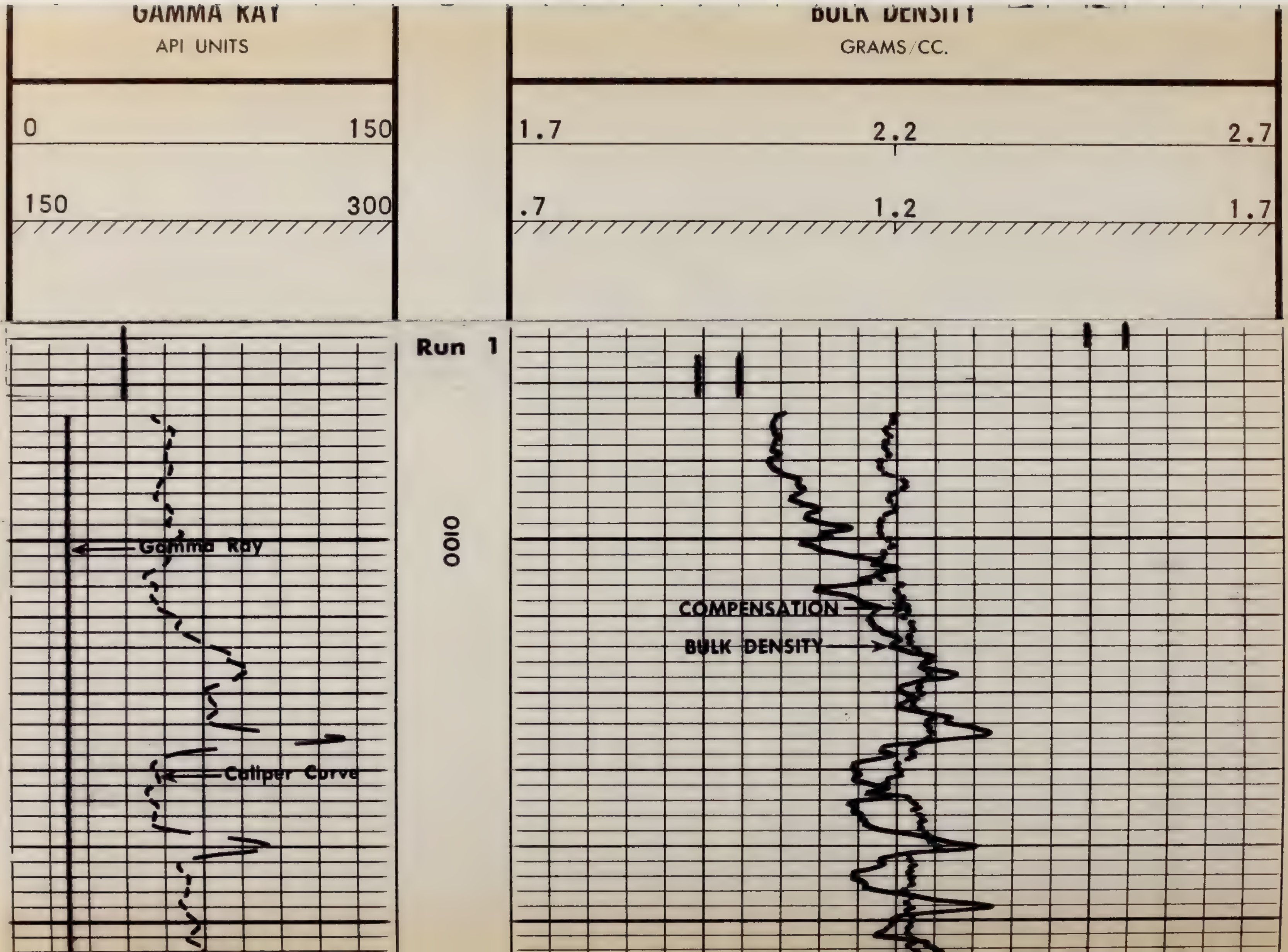
RUN 1

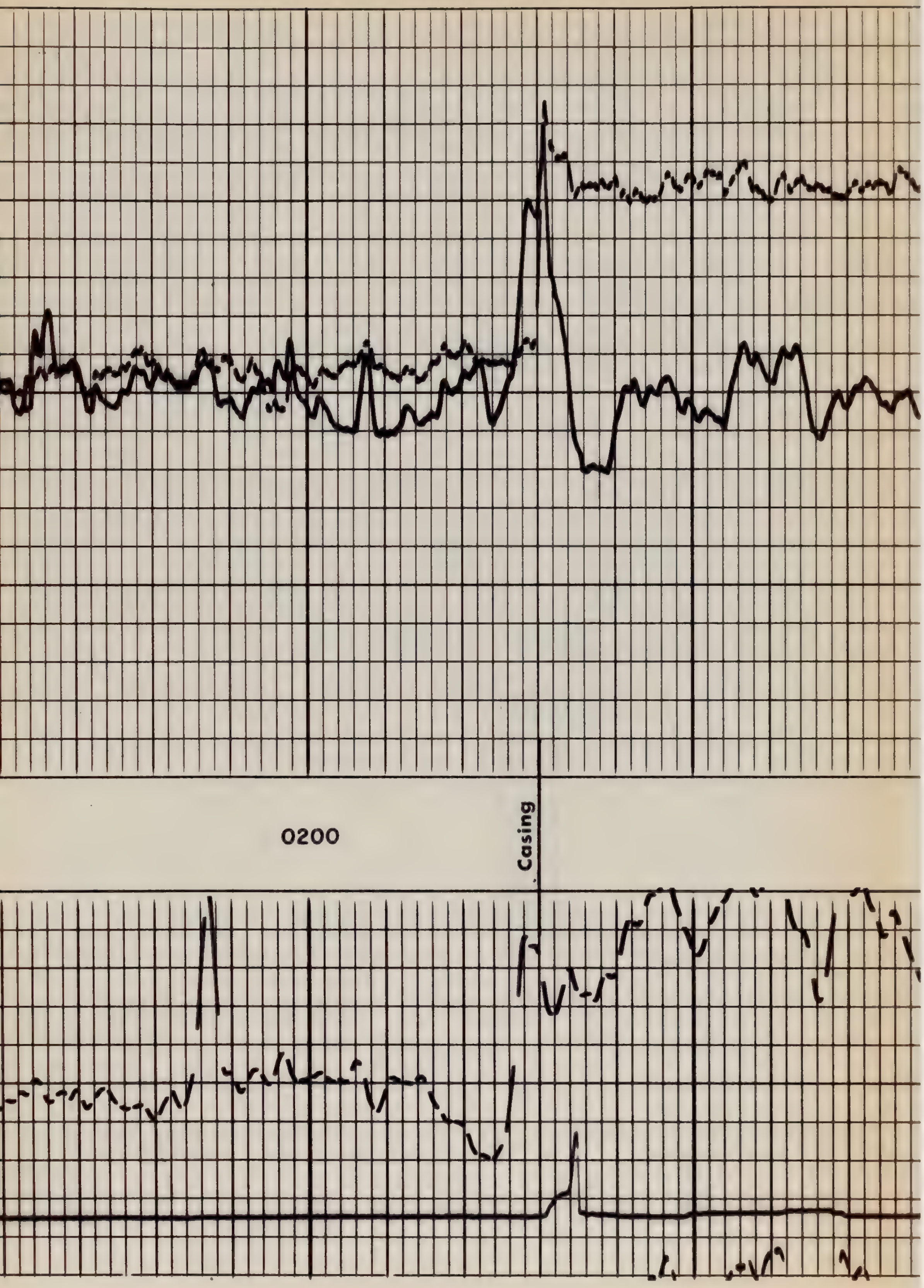

COMPENSATION
BULK DENSITY
0100
0200
Casing
0300
Gamma Ray
Caliper Curve

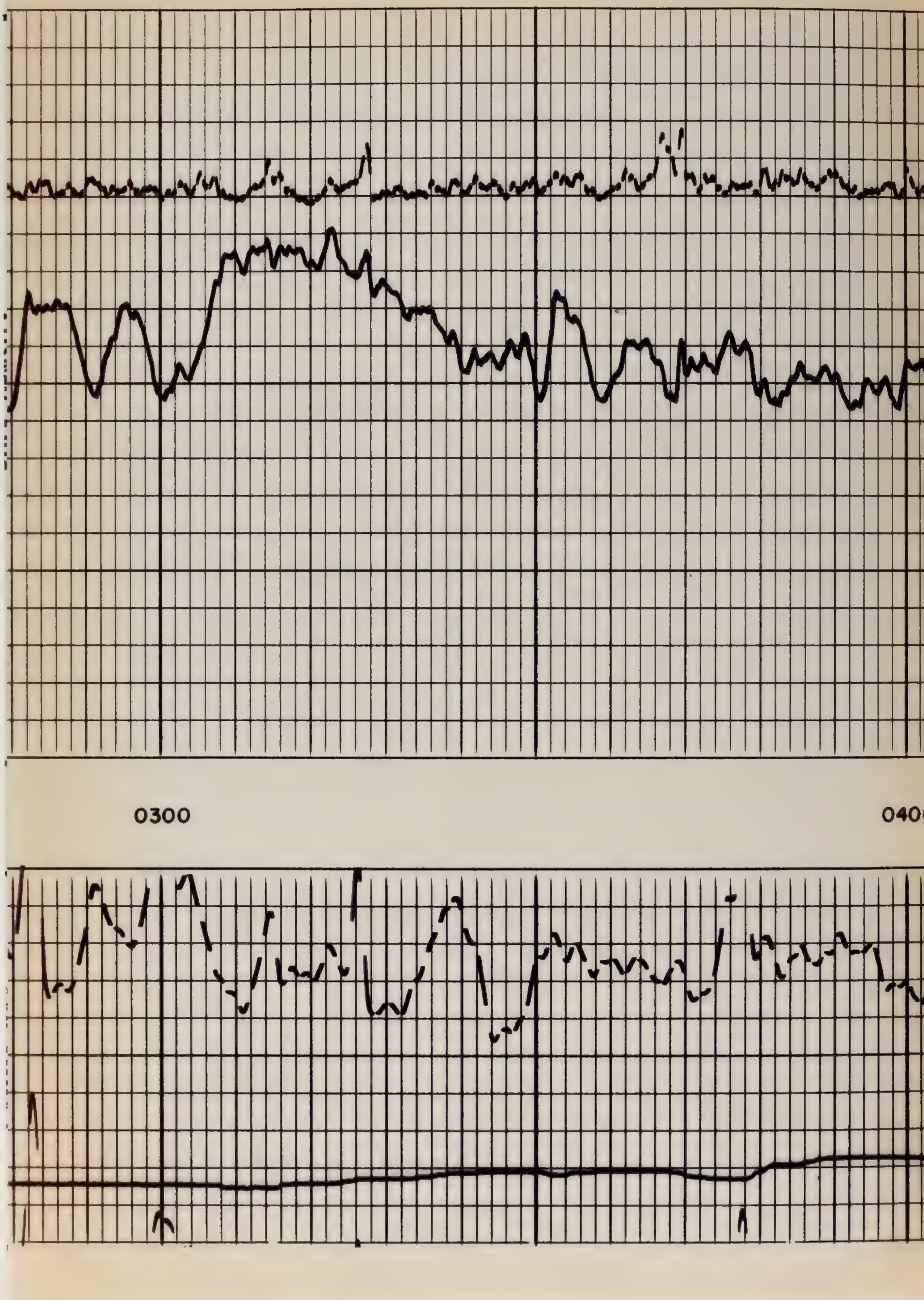

400
0500
0600

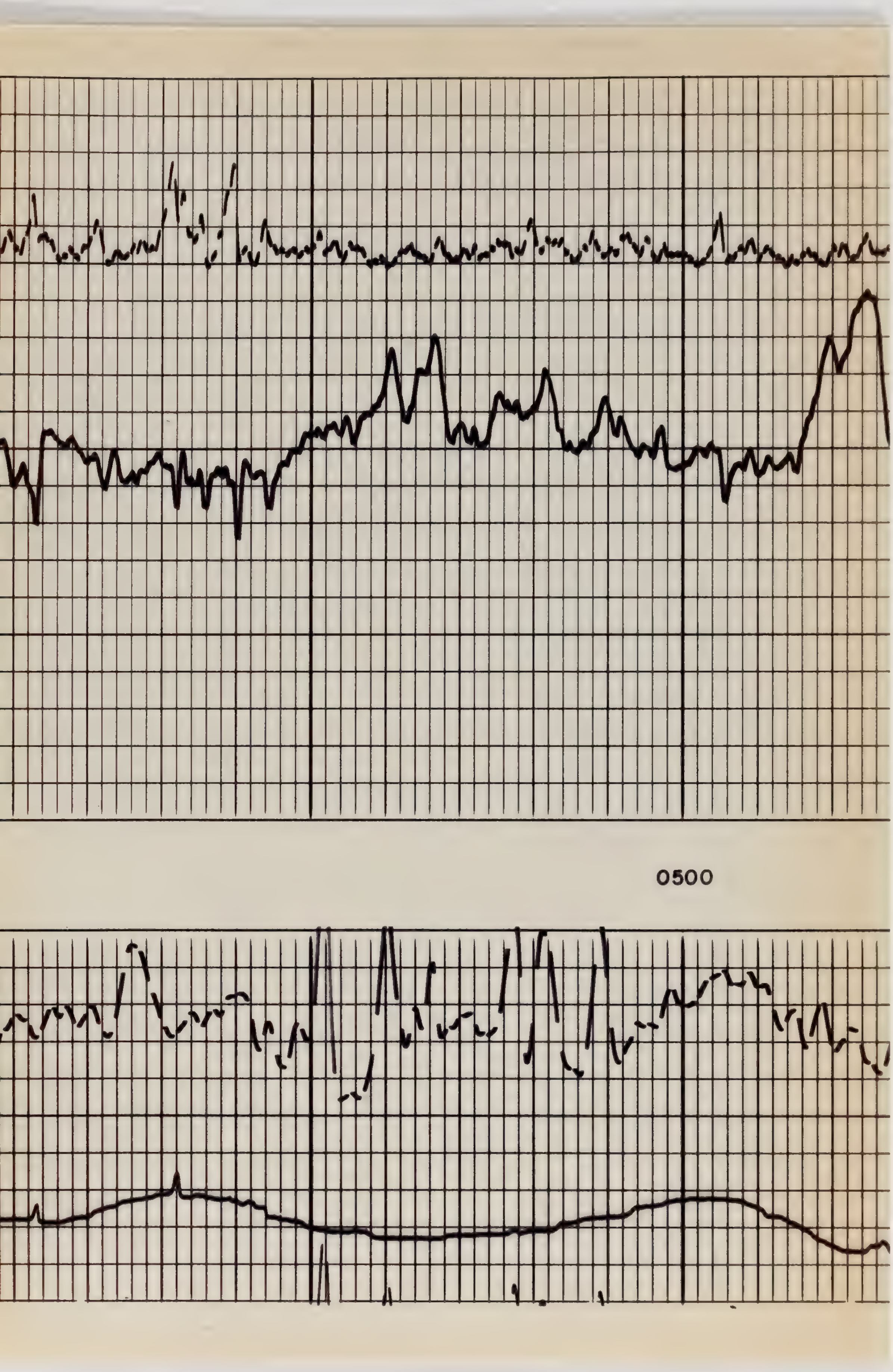

COMPENSATION
BULK DENSITY
)700
0800
0900
100
Caliper Curve
Gamma Ray
Run 2


1100
Run 2
5" DETAIL LOG
CALIPER
HOLE DIAM. IN INCHES
5
15
DEPTHS
−.25
0
+ .25
CORRECTION
GRAMS/CC.
GAMMA RAY
BULK DENSITY


GAMMA RAY
API UNITS
0
150
150
300
BULK DENSITY
GRAMS/CC.
1.7
2.2
2.7
.7
1.2
1.7
Run 1
0100
Gamma Ray
Caliper Curve
COMPENSATION
BULK DENSITY


0200
Casing


0300
0400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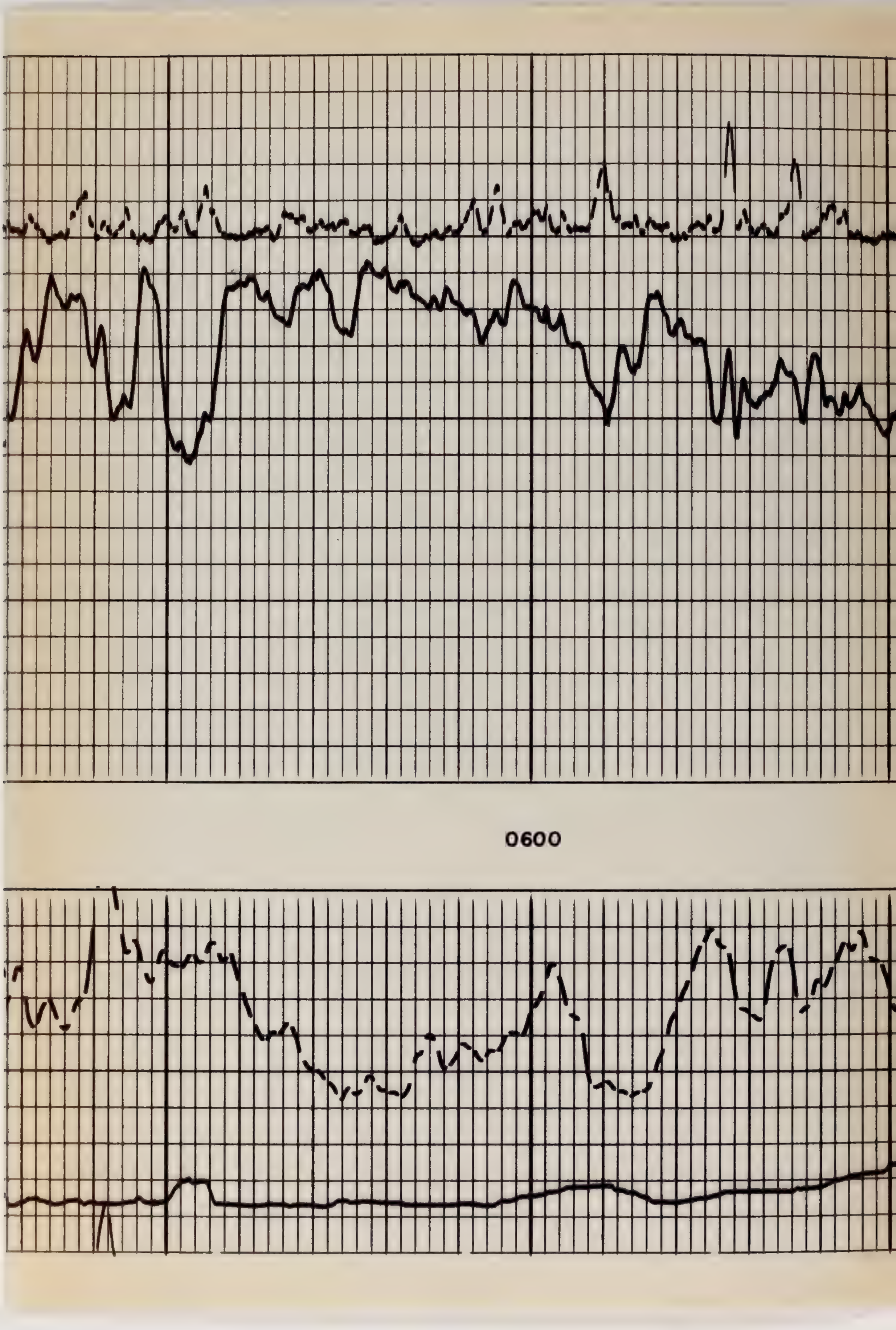
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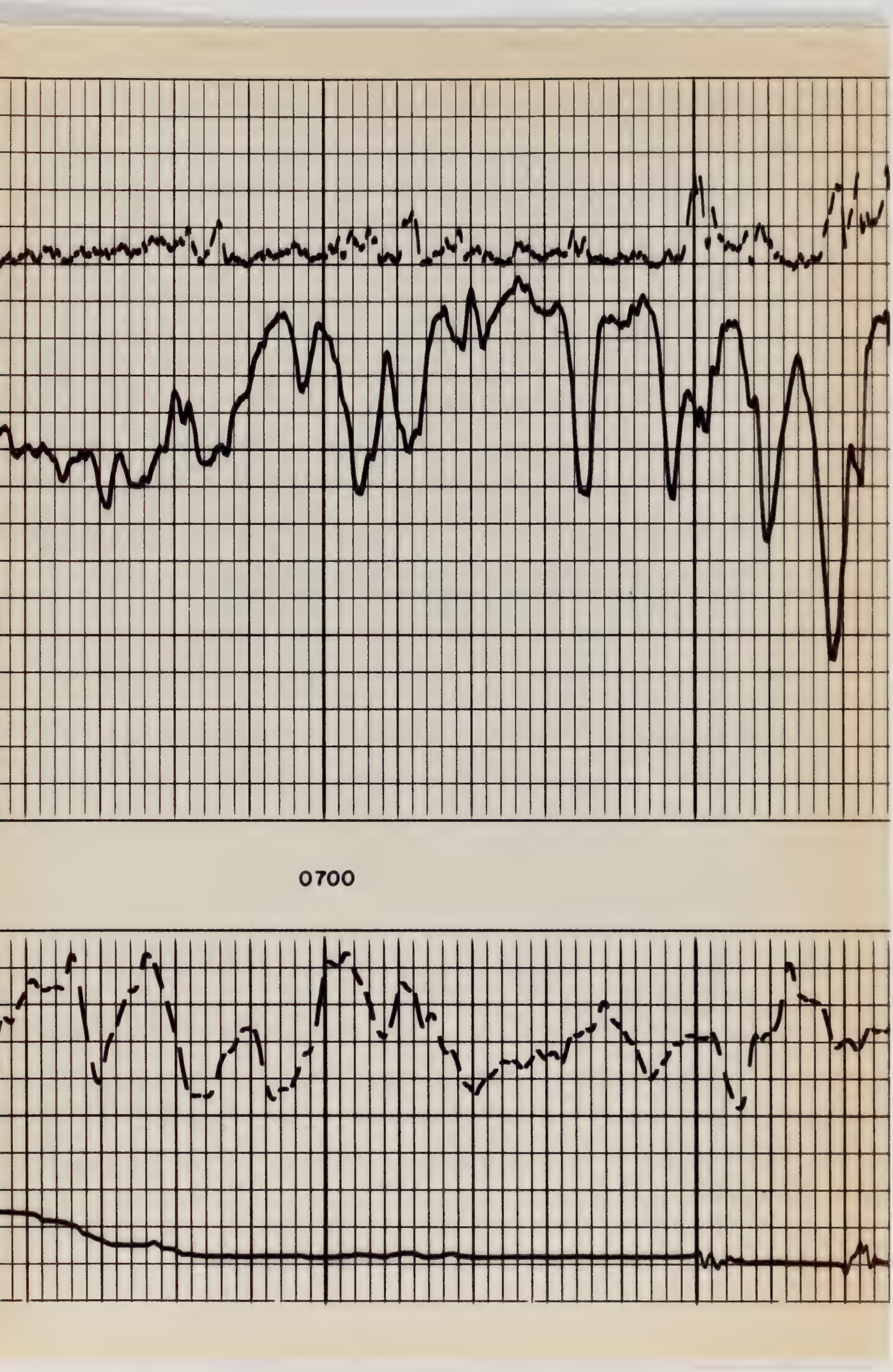
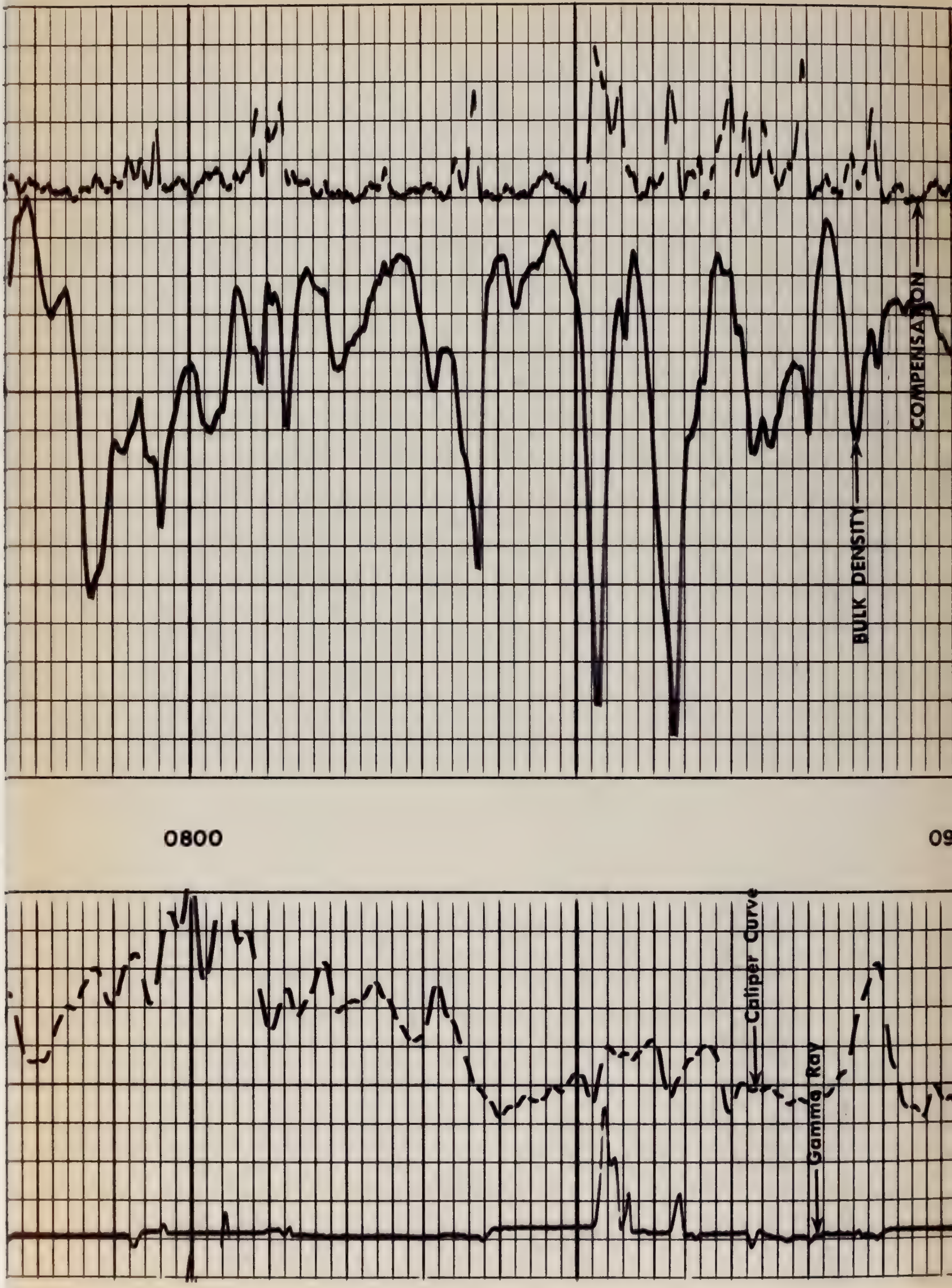
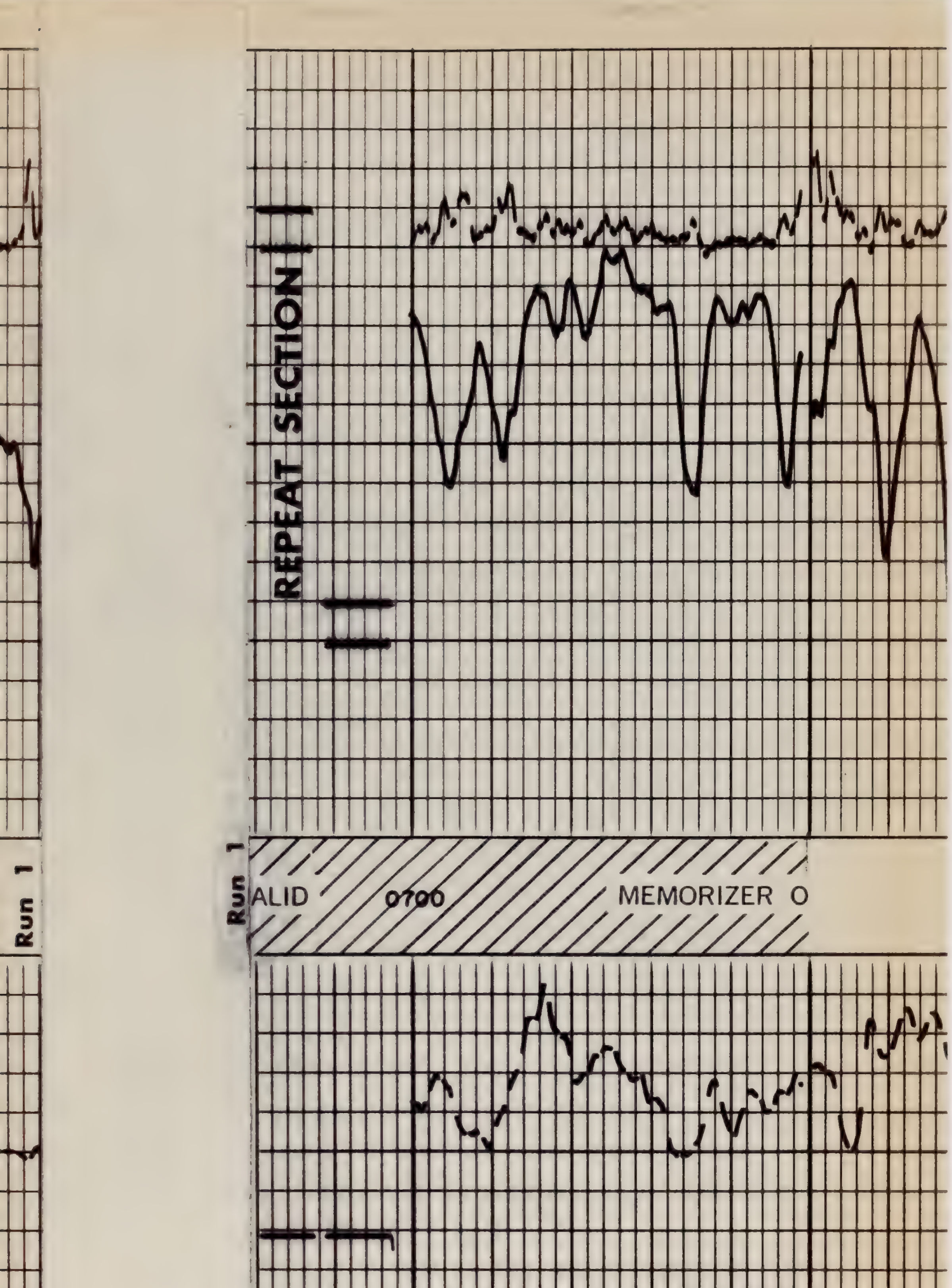
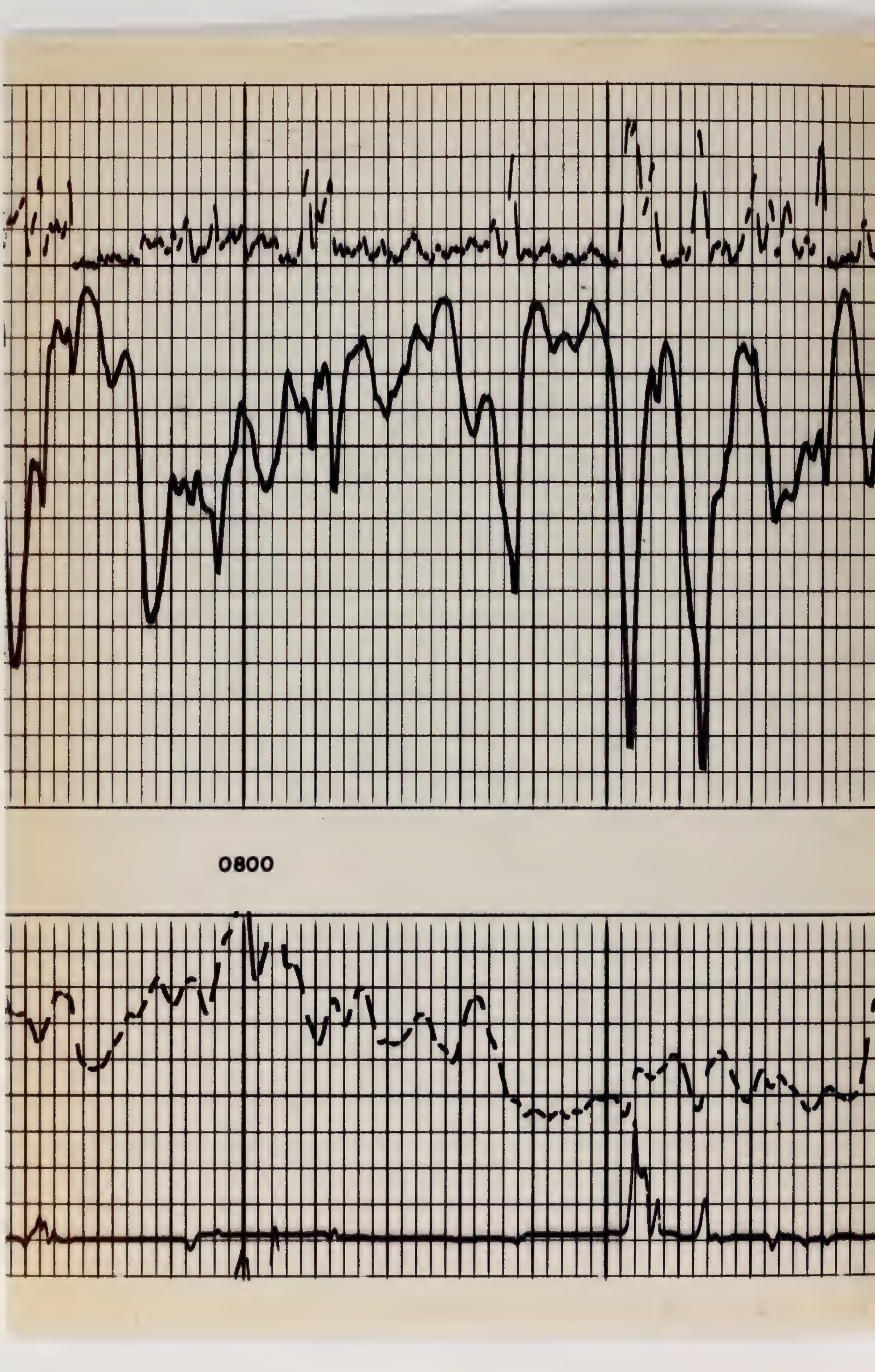

0700


COMPENSATION
BULK DENSITY
0800
09
Caliper Curve
Gamma Ray


REPEAT SECTION
Run 1
Run 1
ALID
0700
MEMORIZER O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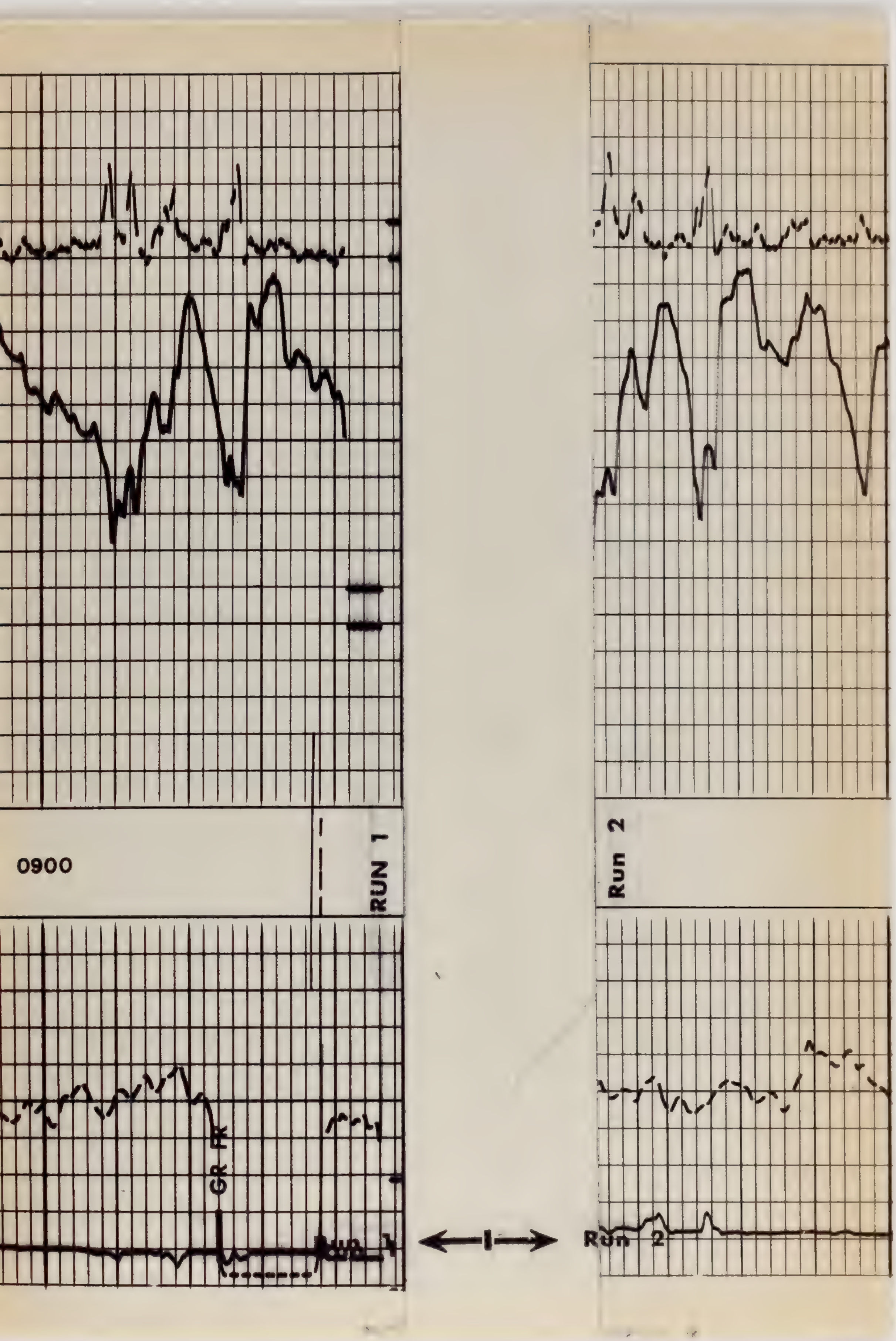
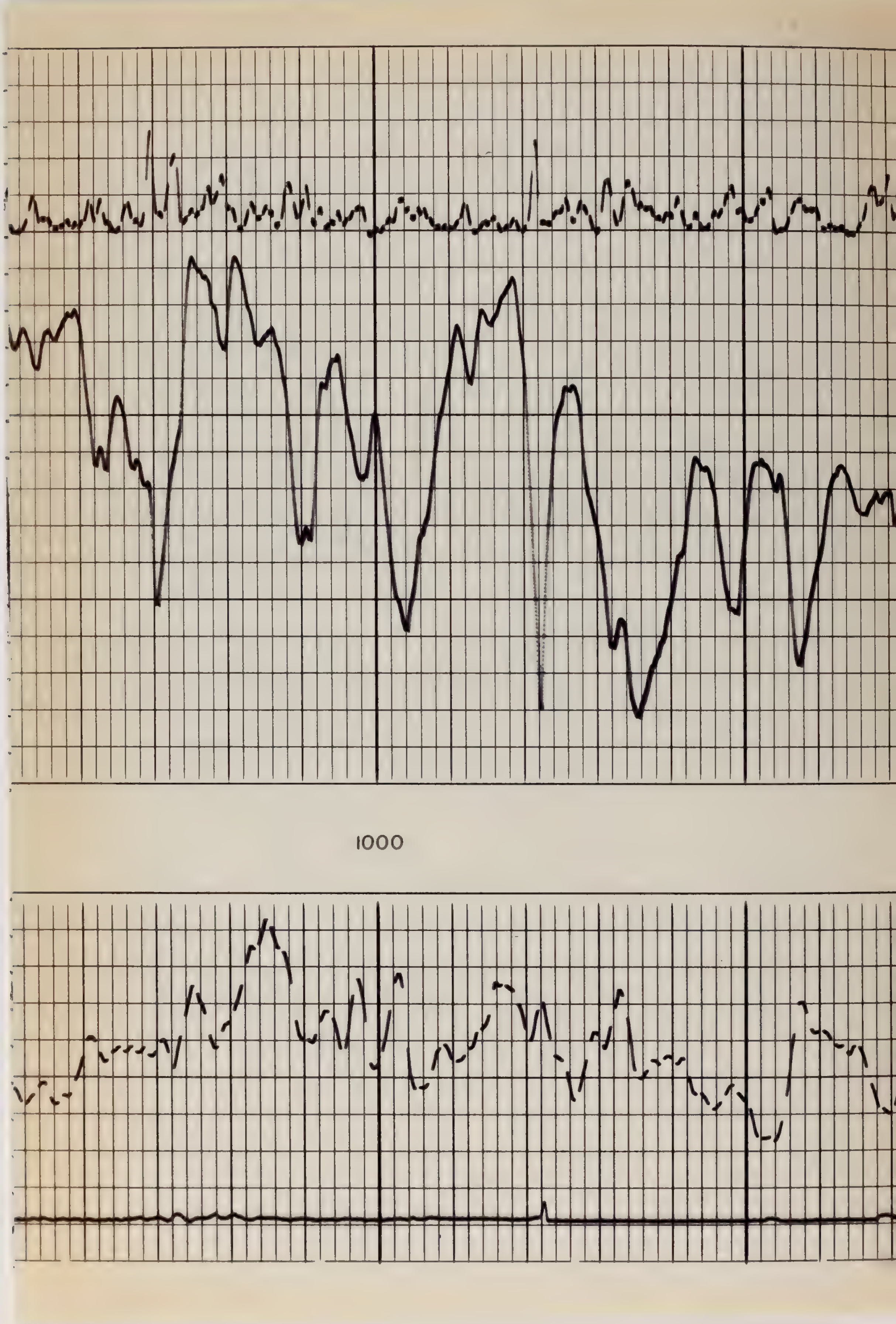


0900
RUN 1
Run 2
GR FR
Run 1
1
Run 2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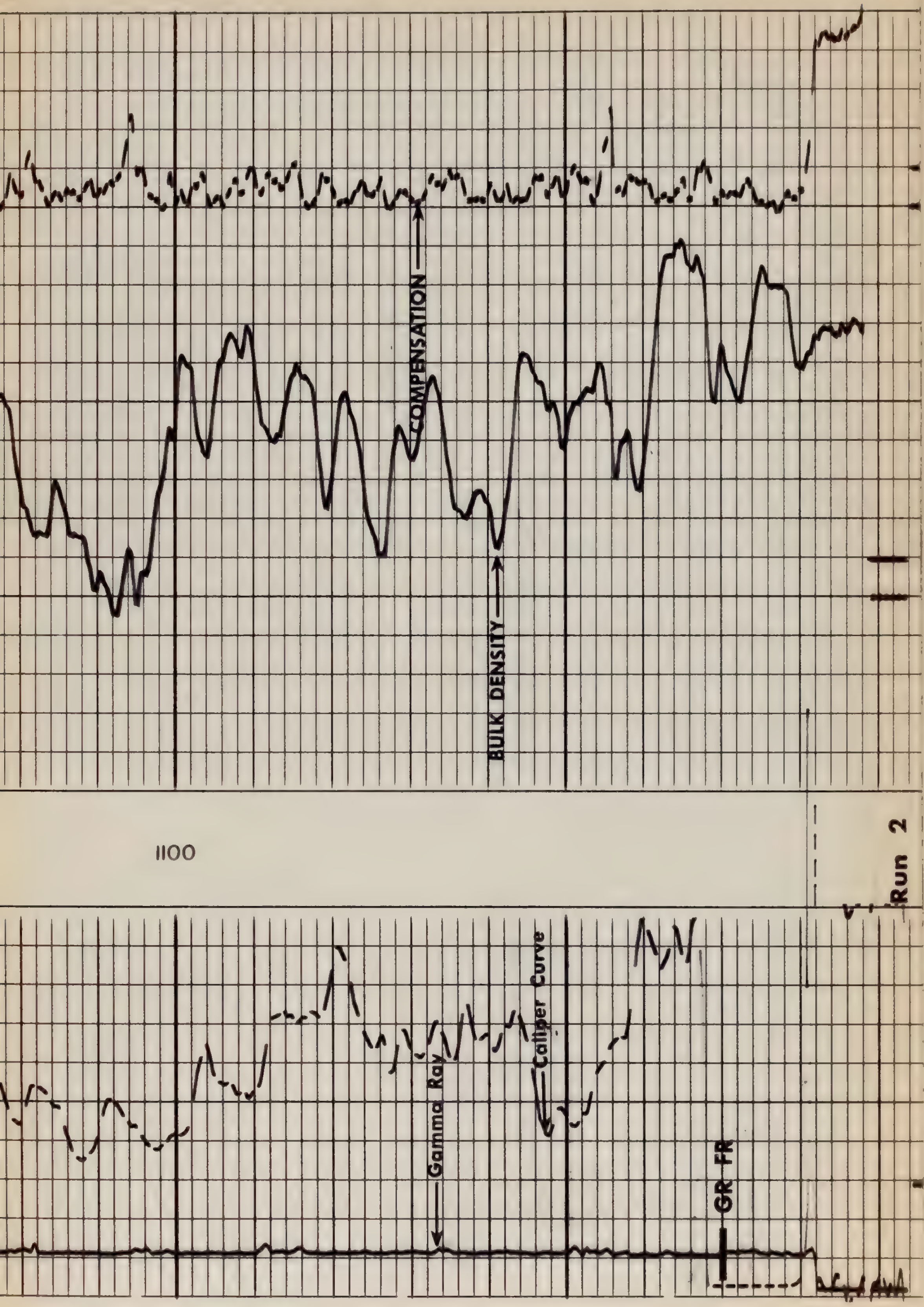
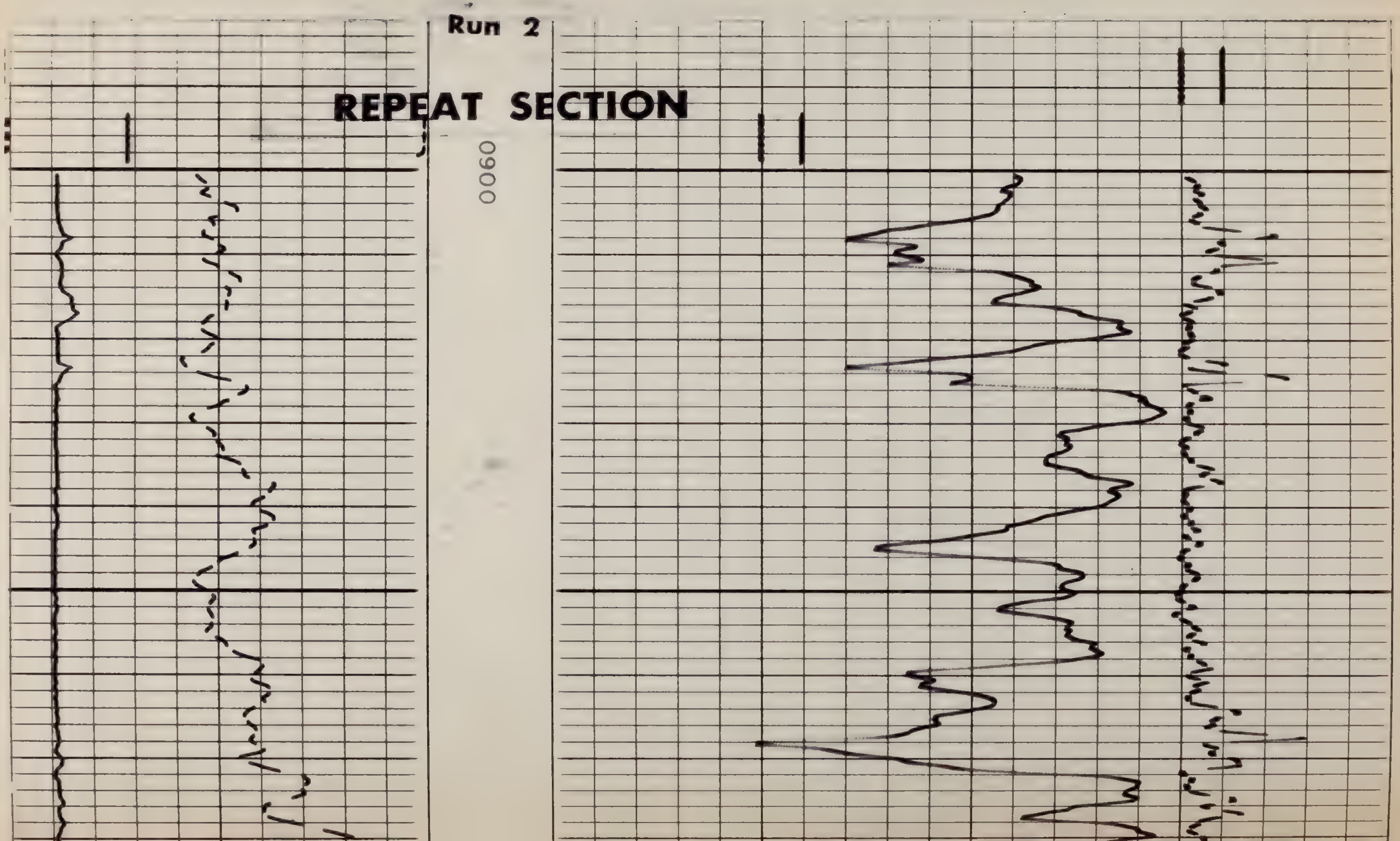
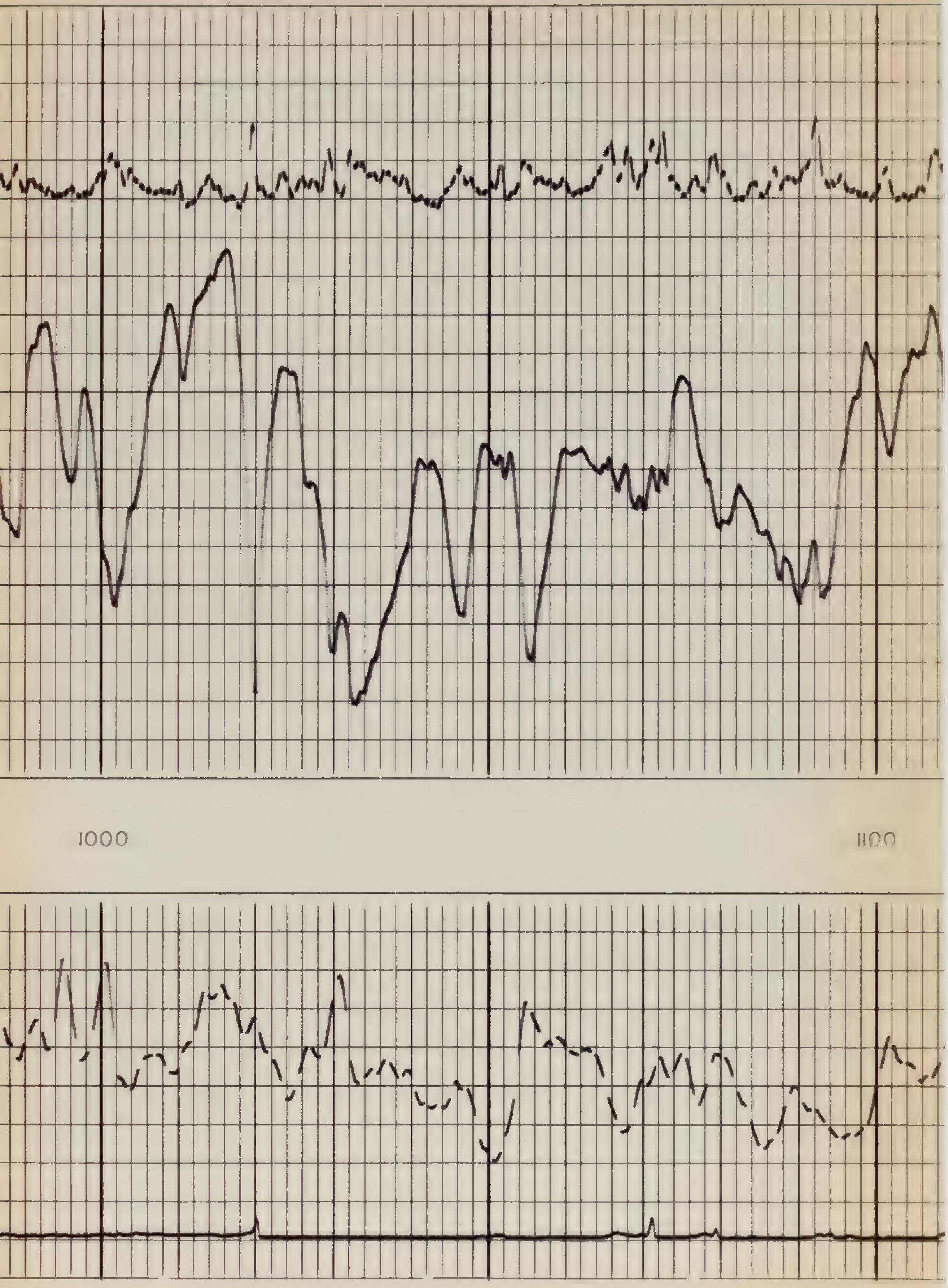
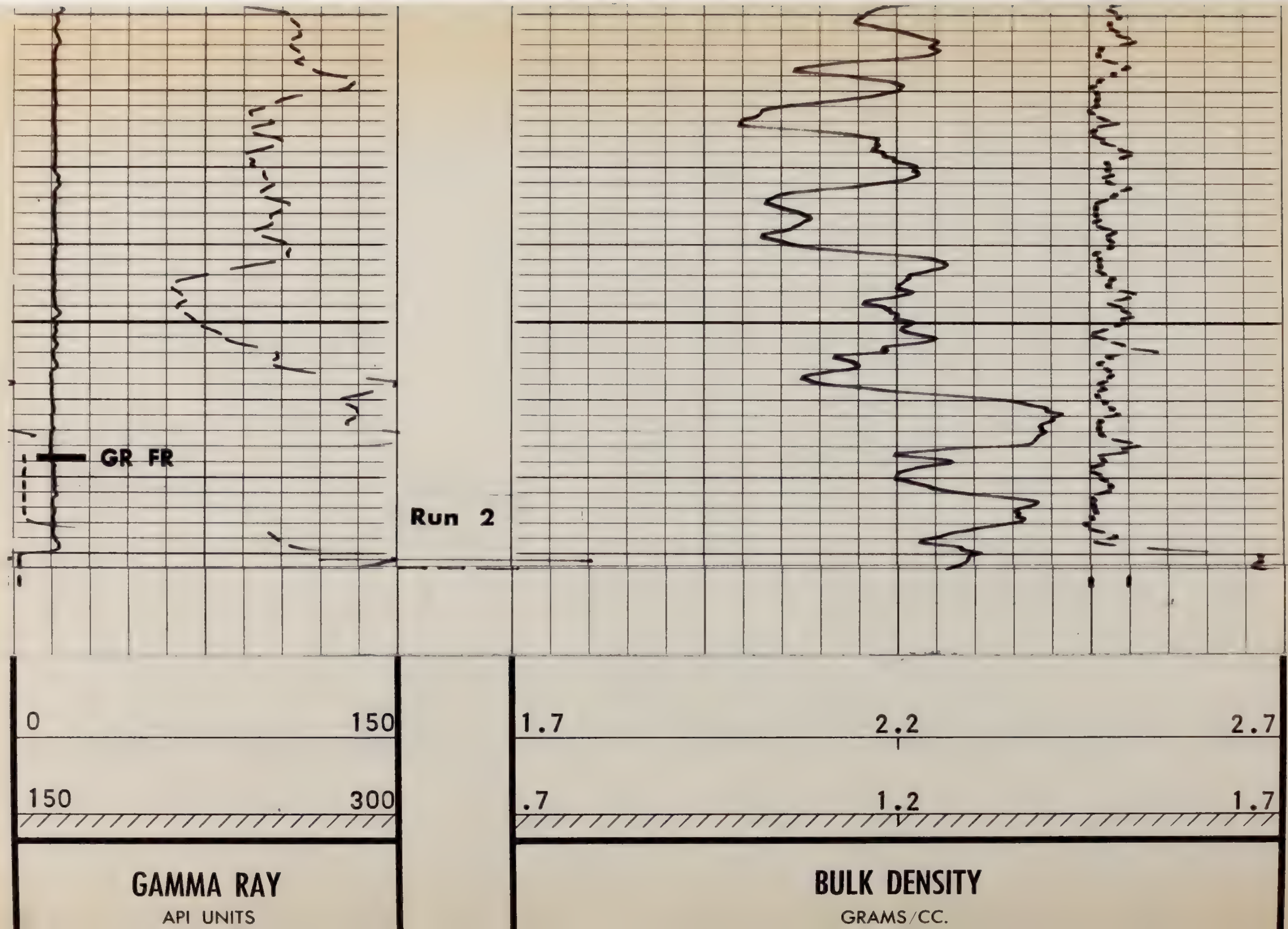

COMPENSATION
BULK DENSITY
1100
Run 2
Gamma Ray
Caliper Curve
GR FR


Run 2
REPEAT SECTION
0900


1000
1100


GR FR
Run 2
0
150
150
300
1.7
2.2
2.7
.7
1.2
1.7
GAMMA RAY
API UNITS
BULK DENSITY
GRAMS/CC.

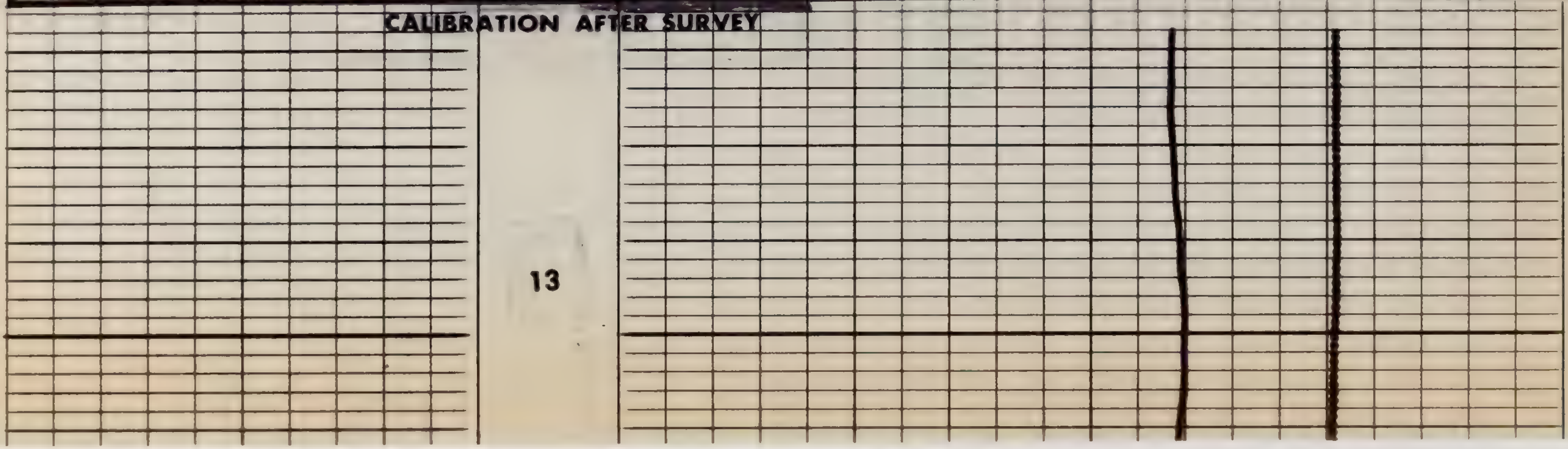
5 15		−.25 0 +.25
CALIPER HOLE DIAM. IN INCHES	DEPTHS	**CORRECTION** GRAMS/CC.

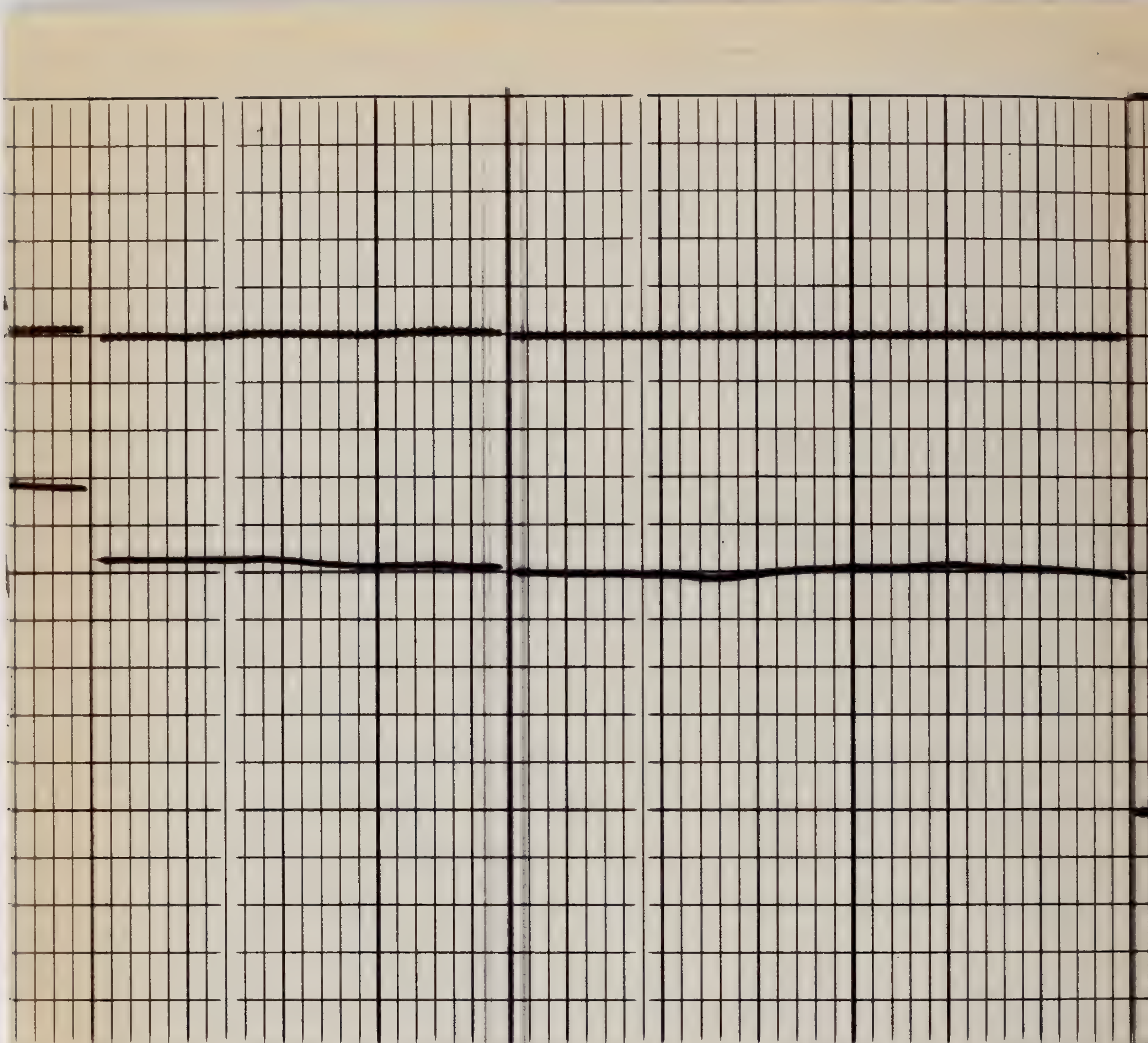
COMPANY ATLANTIC RICHFIELD CO.
WELL SORGHUM GULCH 1-A
FIELD SORGHUM GULCH
COUNTY RIO BLANCO STATE COLORADO

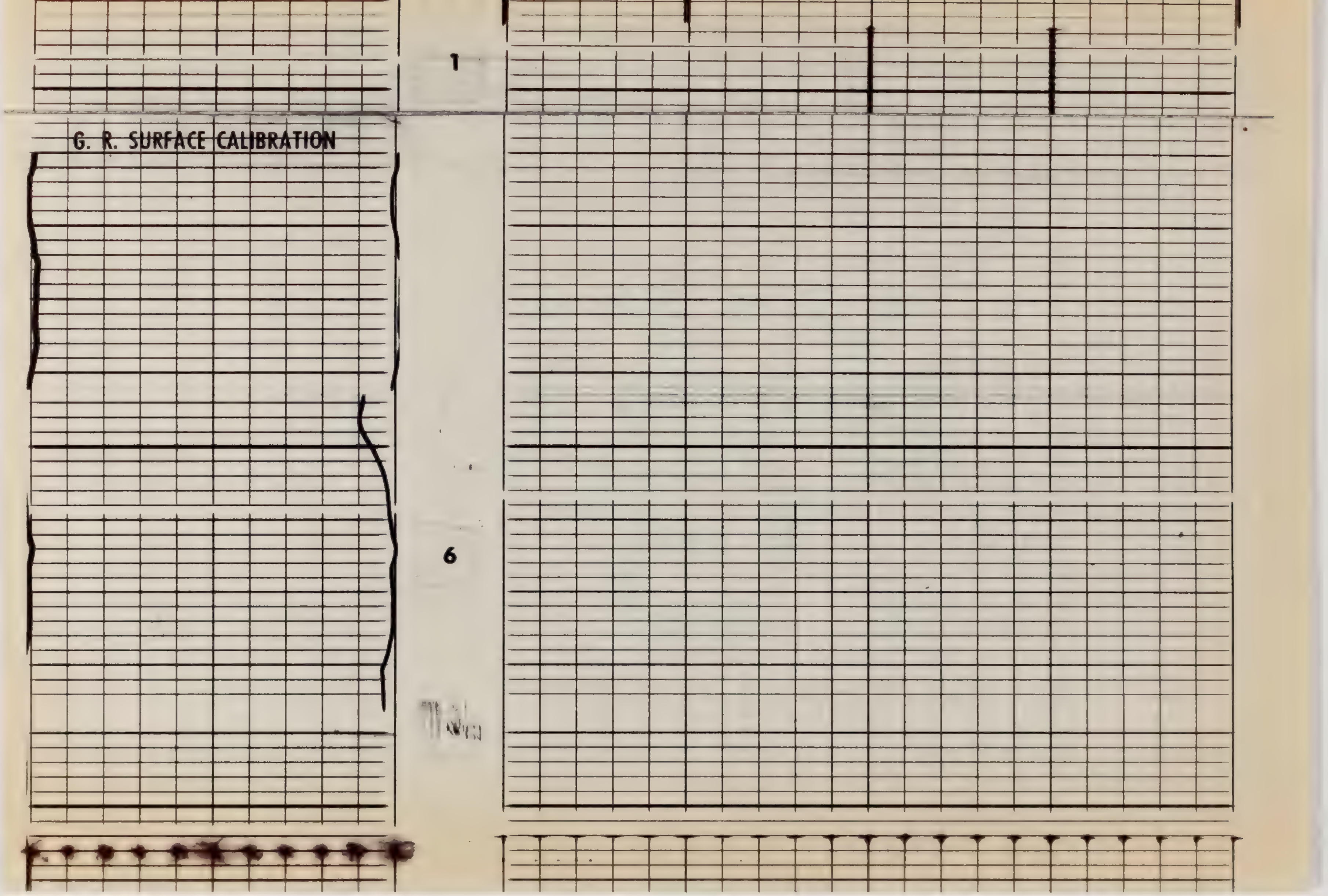
SCHL. FR 937
SCHL. TD 938
DRLR TD 938
Elev:
KB ----
DF -----
GL ----

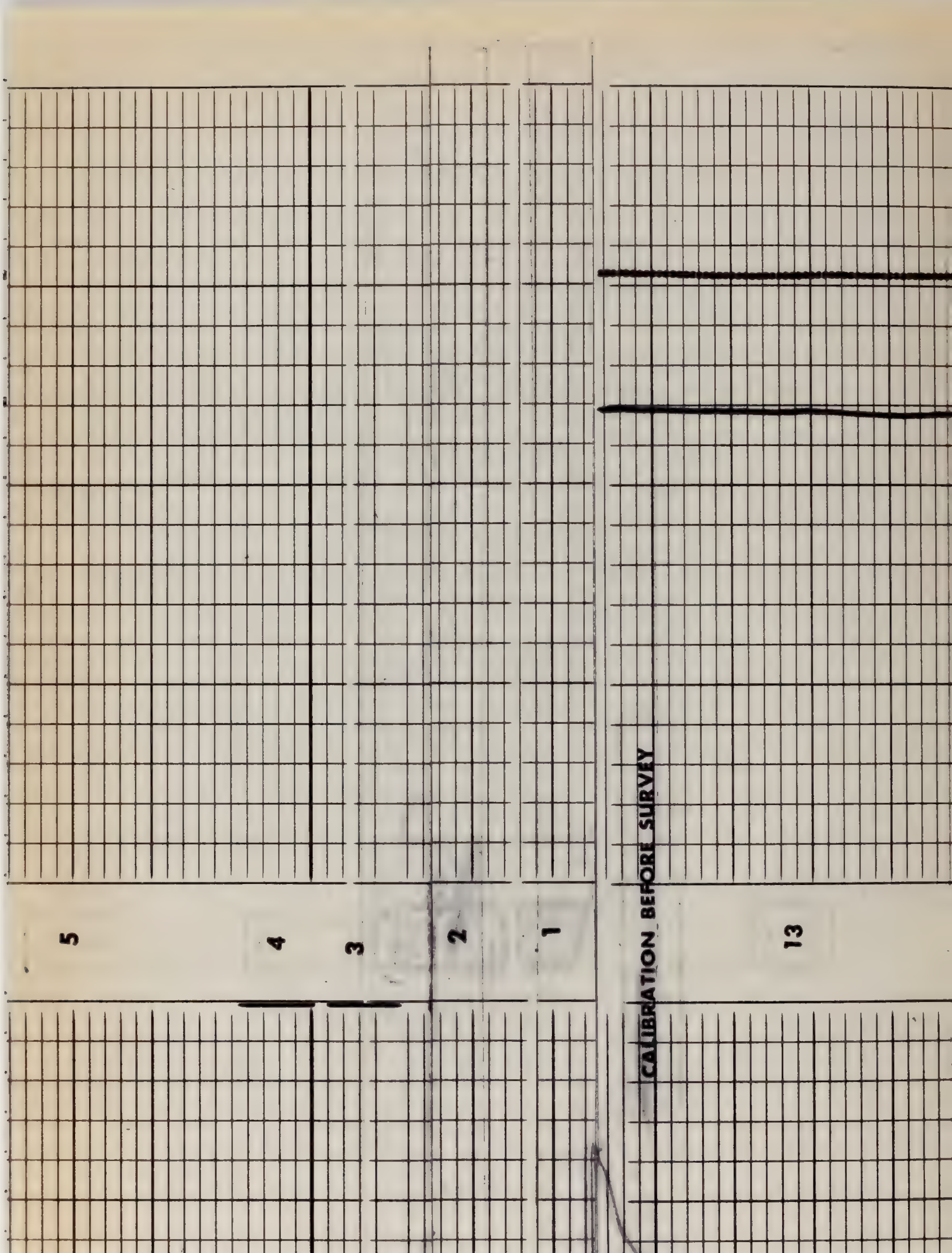
CALIBRATION RECORD

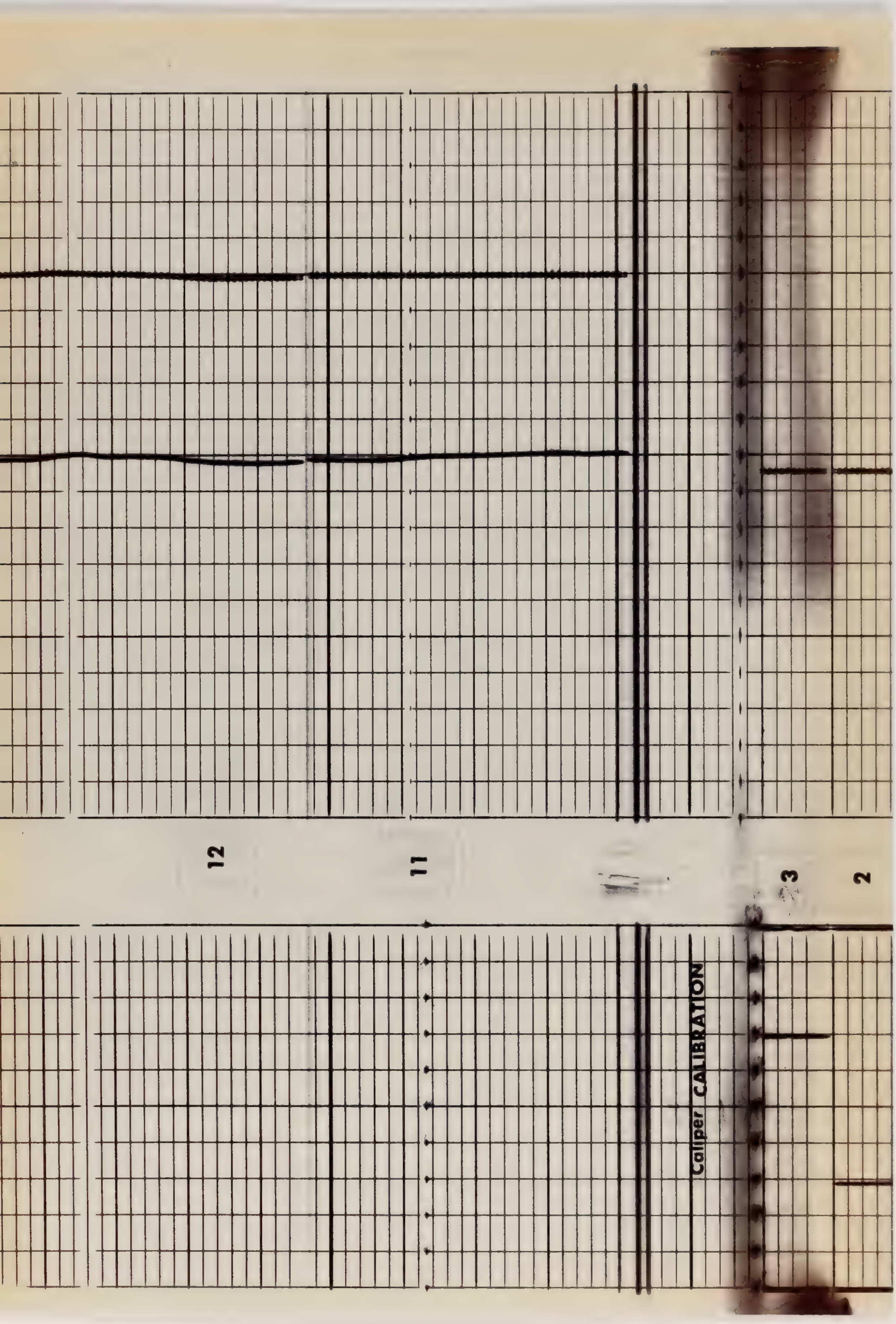
Run 1

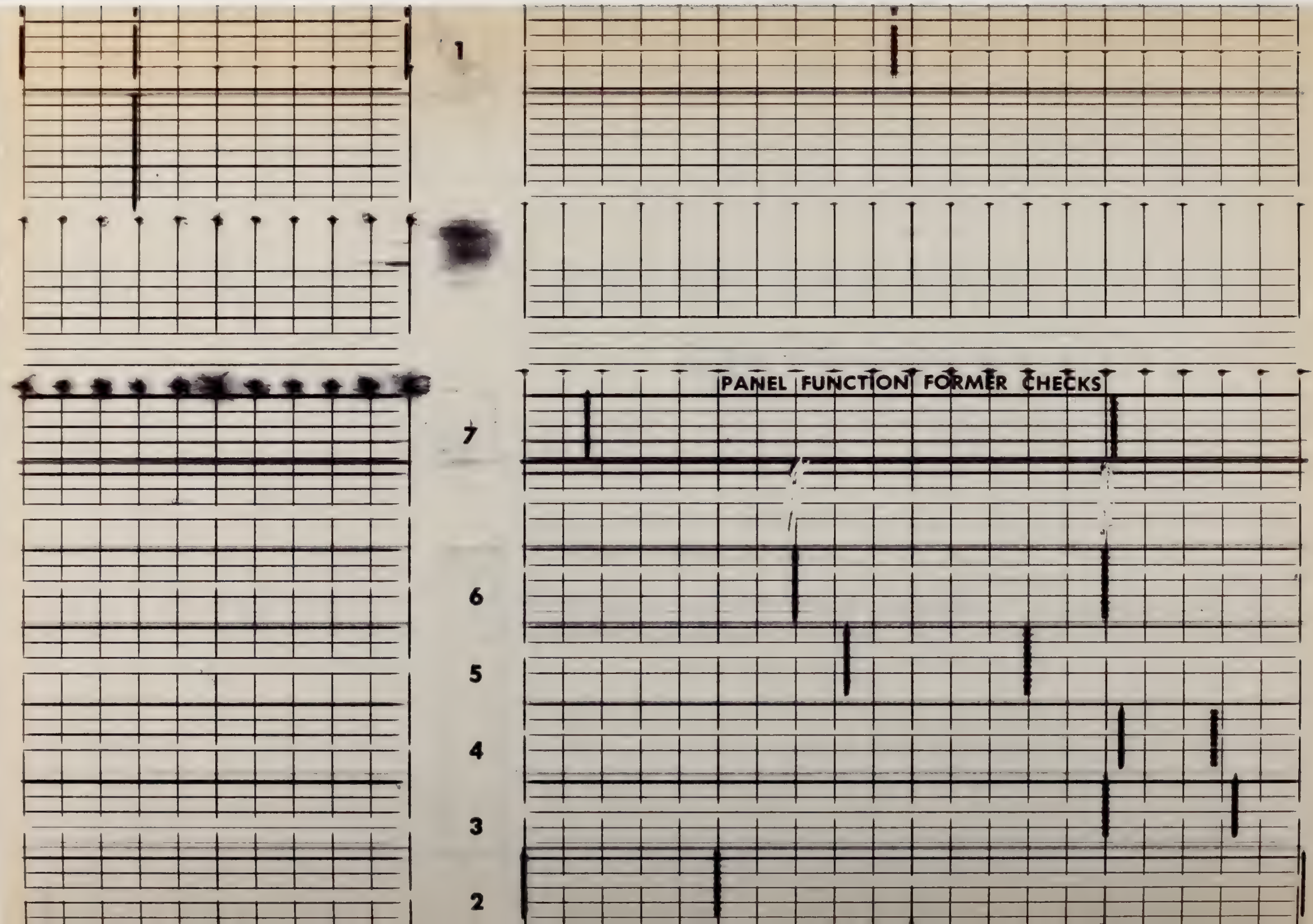


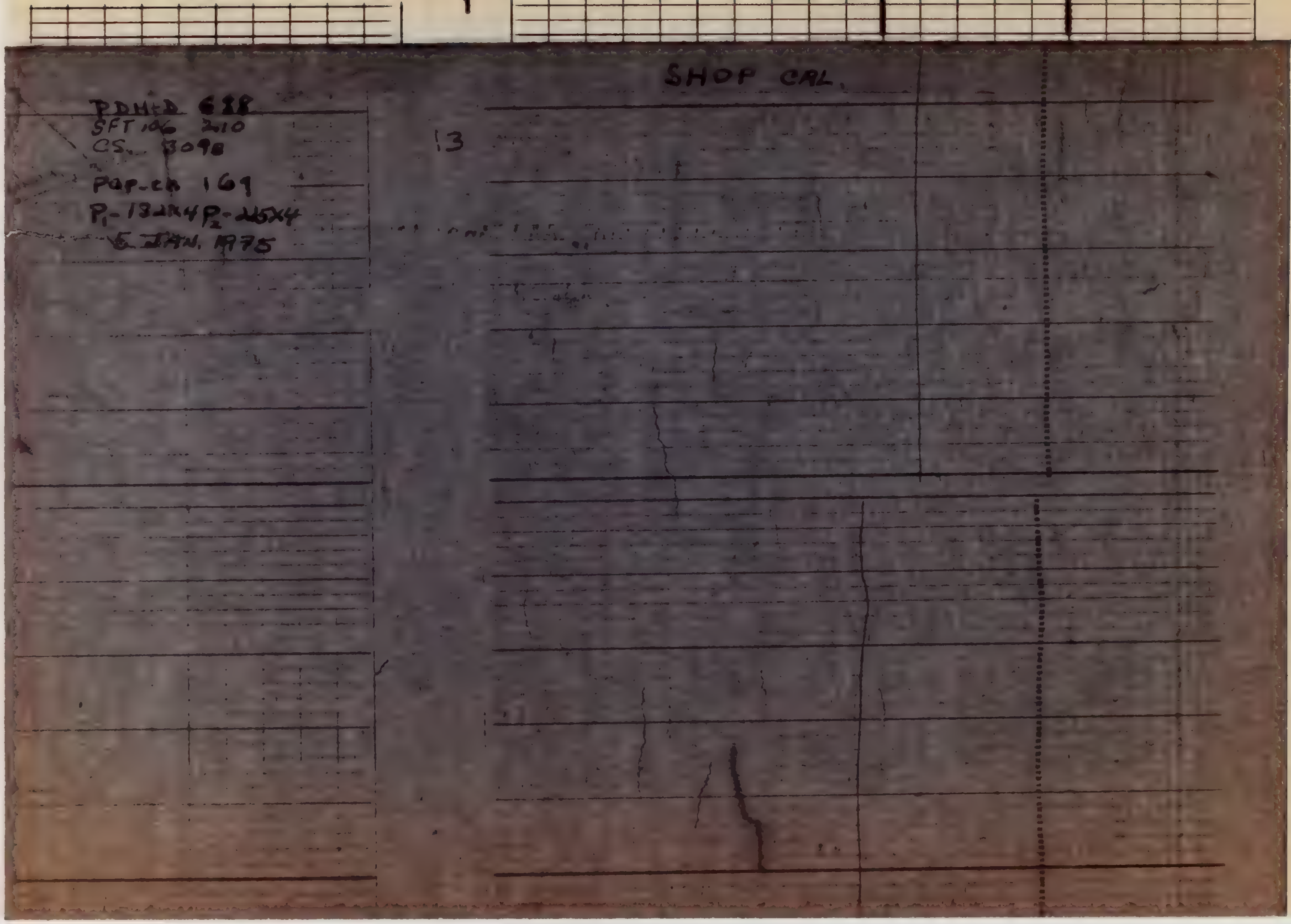

12
11


1
G. R. SURFACE CALIBRATION
6

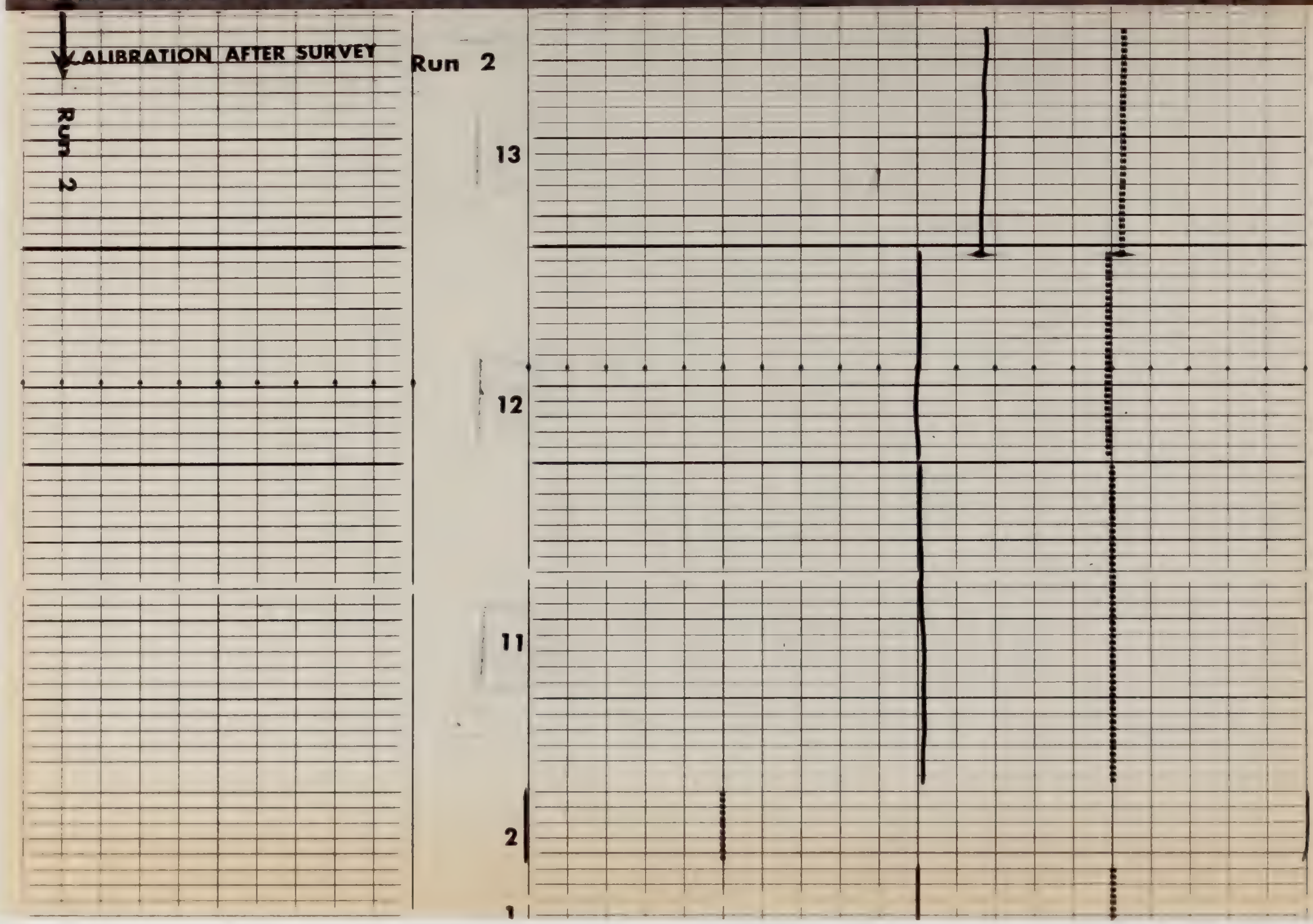

5
4
3
2
1
CALIBRATION BEFORE SURVEY
13


12
11
3
2
Caliper CALIBRATION

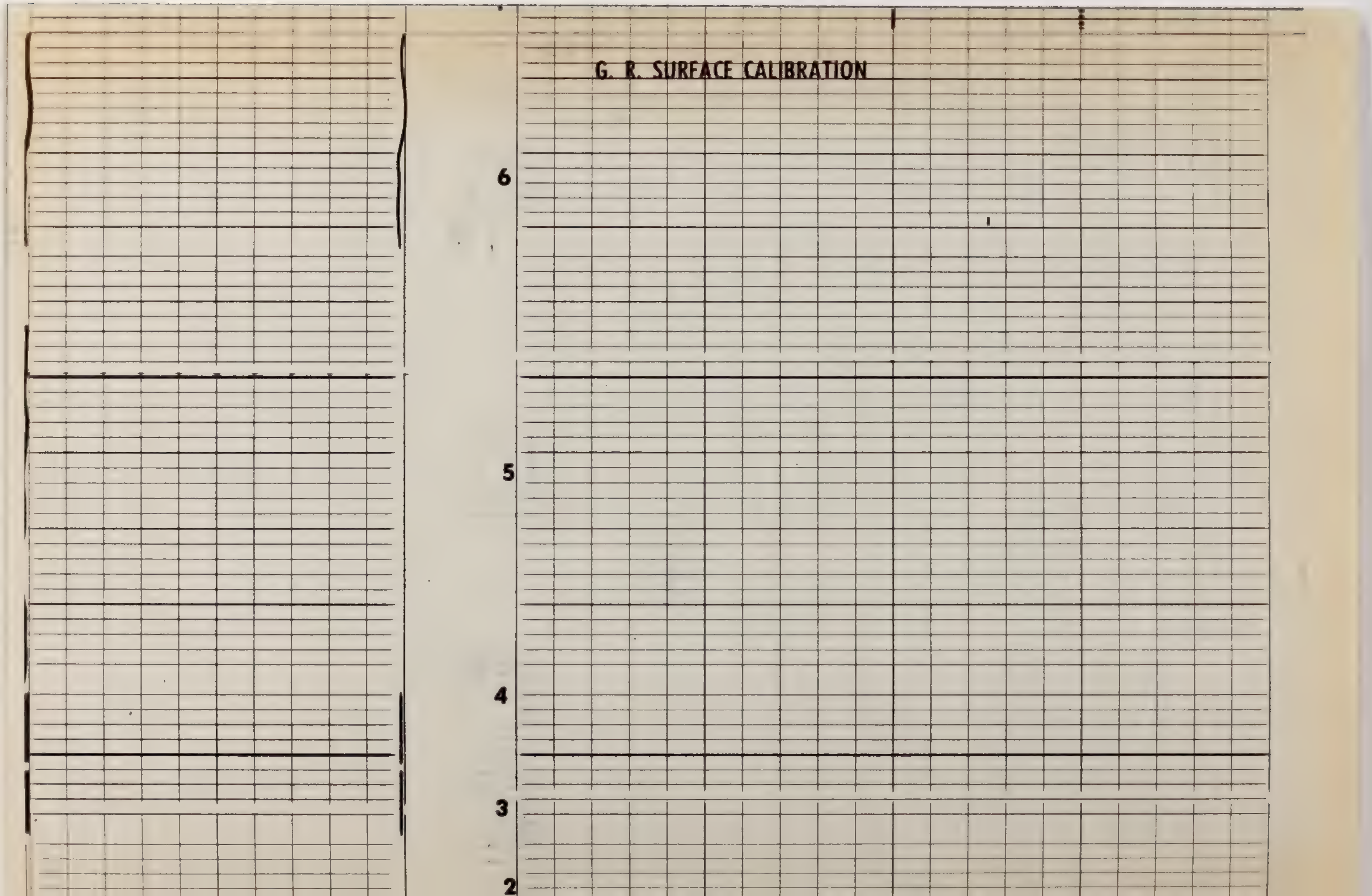

1
7
PANEL FUNCTION FORMER CHECKS
6
5
4
3
2

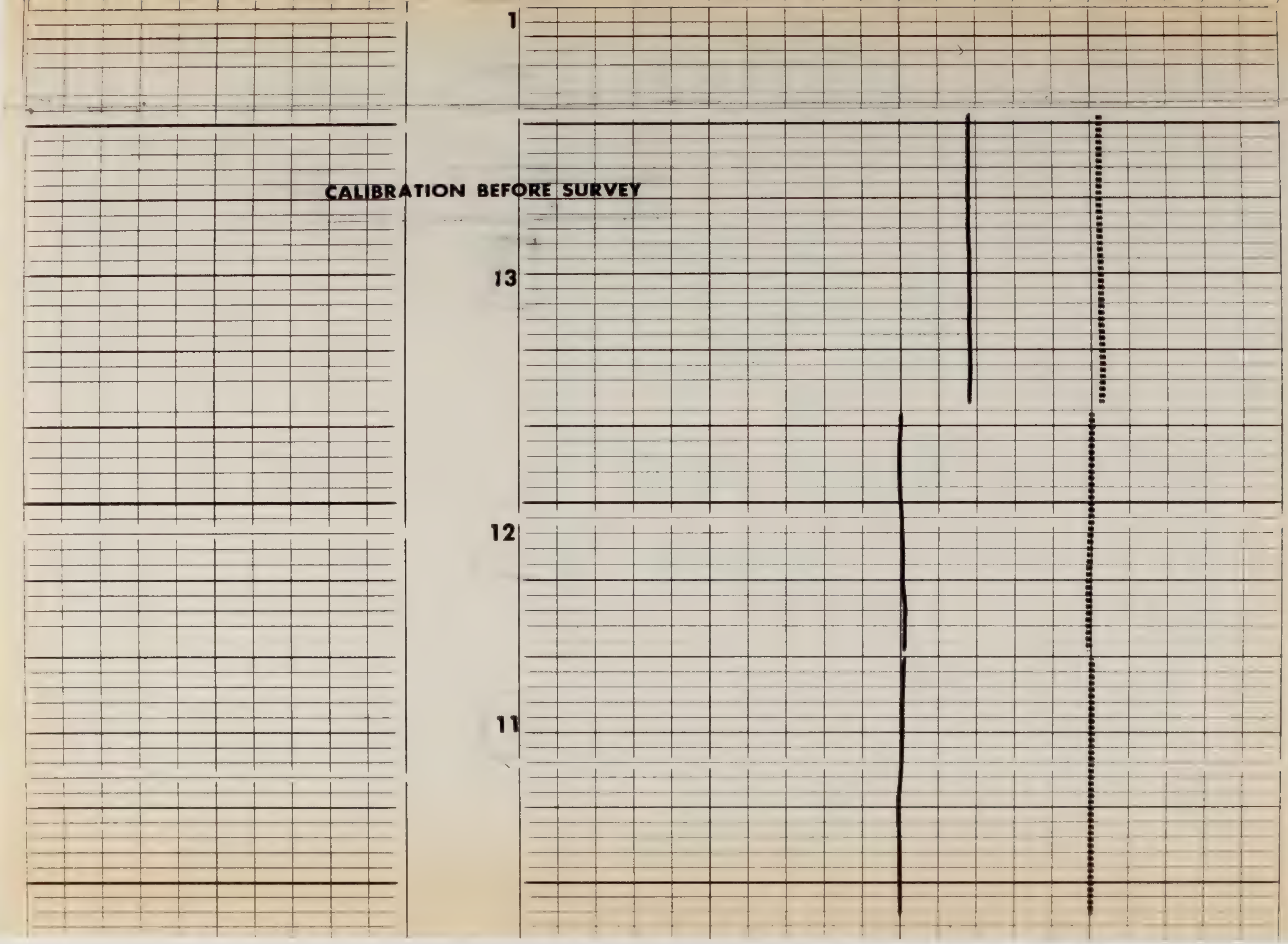

SHOP CAL.
PDHtD 628
SFT 106 210
CS. 3098
Pop-ch 169
P1-132x4 P2-215x4
6 JAN. 1975
13

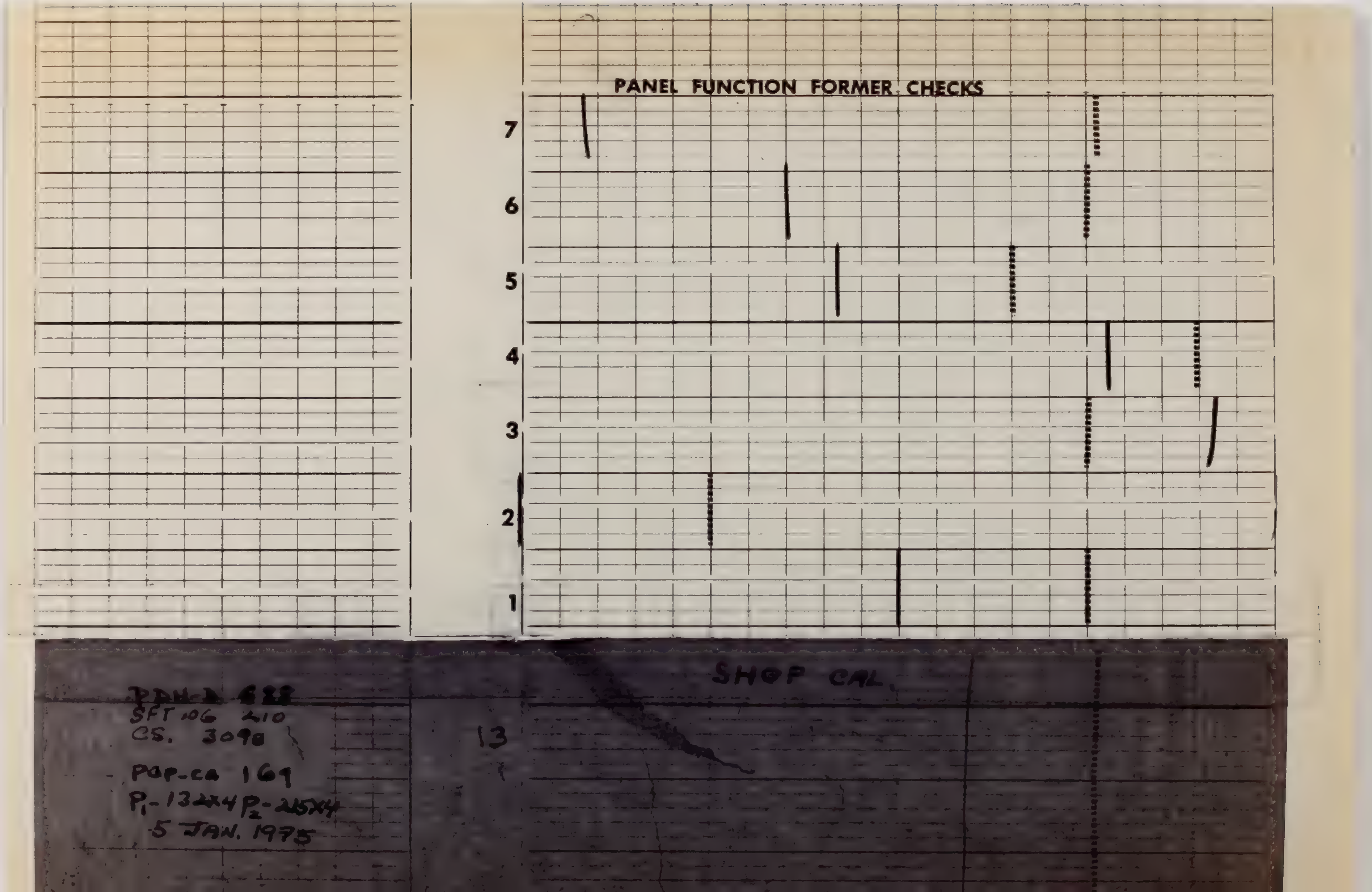
12
11
2
Run



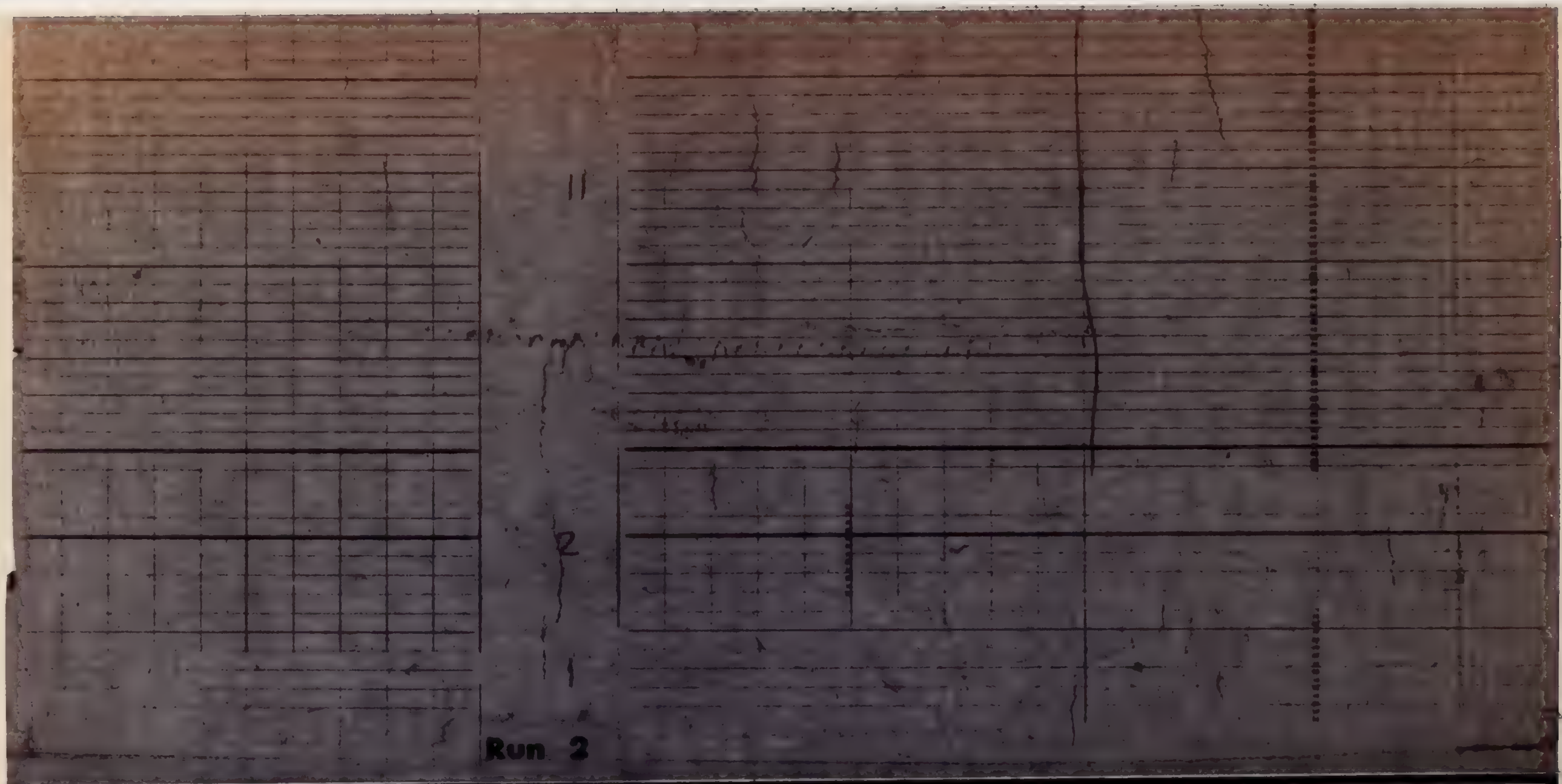
CALIBRATION AFTER SURVEY
Run 2
Run 2
13
12
11
2
1


G. R. SURFACE CALIBRATION
6
5
4
3
2


1
CALIBRATION BEFORE SURVEY
13
12
11


PANEL FUNCTION FORMER CHECKS
7
6
5
4
3
2
1
SHOP CAL
13
PDM-D 688
SFT 106 210
CS. 3098
POP-CA 169
P1-132X4 P2-215X4
5 JAN. 1975

12



FORMATION DENSITY COMPENSATED CALIBRATION CODING

1. MECHANICAL ZERO
2. RECORDER SENSITIVITY

PANEL TEST

FDC LIQUID

	POS	ρ	$\Delta\rho$
3.	# 1	2.92	.00
4.	# 2	2.78	+.14
5.	# 3	2.42	−.10
6.	# 4	2.35	.00

8. MECHANICAL ZERO CALIPER
9. 8″ RING
10. 12″ RING
11. TOOL CALIBRATE #1 SET $\rho = 2.50$
12. TOOL CALIBRATE #2 SET $\Delta\rho = .00$
13. LOG POSITION $\rho = 2.59$, $\Delta\rho = .015$

CALIBRATION RECORD

COMPANY ATLANTIC RICHFIELD COMPANY
WELL SORGHUM GULCH 1-A
FIELD SORGHUM GULCH
COUNTY RIO BLANCO STATE COLORADO

SCHL. FR 1181
SCHL. TD 1182
DRLR TD 1180
Elev:
KB
DF
GL

Schlumberger

OPEN HOLE AMPLITUDE AND VDL

COUNTY RIO BLANCO
FIELD or LOCATION SORGHUM GULCH
WELL SORGHUM GULCH 1-A
COMPANY ATLANTIC RICHFIEL

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH 1-A

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

LOCATION

Sec. 2 Twp. 3S Rge. 97W

Other Services:
BHC/FDC-GR
TEMP.
LL-7

Permanent Datum: GL, Elev.
Log Measured From GL, 0 Ft. Above Perm. Datum
Drilling Measured From GL

Elev.: K.B.
D.F.
G.L.

Date	2-1-75			
Run No.	ONE			
Depth—Driller	1180			
Depth—Logger	1182			
Btm. Log Interval	1173			
Top Log Interval	230			
Casing—Driller	7 @ 230	@	@	@
Casing—Logger	230			
Bit Size	6-1/4			
Type Fluid in Hole	FORMATION WATER			
Dens. | Visc.				
pH | Fluid Loss	ml	ml	ml	ml
Source of Sample				
R_m @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
R_{mf} @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
R_{mc} @ Meas. Temp.	@ °F	@ °F	@ °F	@ °F
Source: R_{mf} R_{mc}				
R_m @ BHT	@ °F	@ °F	@ °F	@ °F
Time Since Circ.				
Max. Rec. Temp.	°F	°F	°F	°F
Equip. | Location	5602 | GJ			
Recorded By	GEIGER			
Witnessed By	POWERS			

FOLD HERE The well name, location and borehole reference data were furnished by the customer.

CHANGES IN MUD TYPE OR ADDITIONAL SAMPLES

Date	Sample No.				
Depth - Driller					
Type Fluid in Hole					
Dens.	Visc.				
ph	Fluid Loss		ml		ml
Source of Sample					
R_m @ Meas. Temp.		@	°F	@	°F
R_m @ Meas. Temp.		@	°F	@	°F
R_m @ Meas. Temp.		@	°F	@	°F
Source: R_{mf}	R_{mc}				
R_m @ BHT		@	°F	@	°F
R_m @ BHT		@	°F	@	°F
R_m @ BHT		@	°F	@	°F

SCALE CHANGES

Type Log	Depth	Scale Up Hole	Scale Down Hole	

EQUIPMENT DATA

Run No.				

REMARKS

Service Order No. - 22443

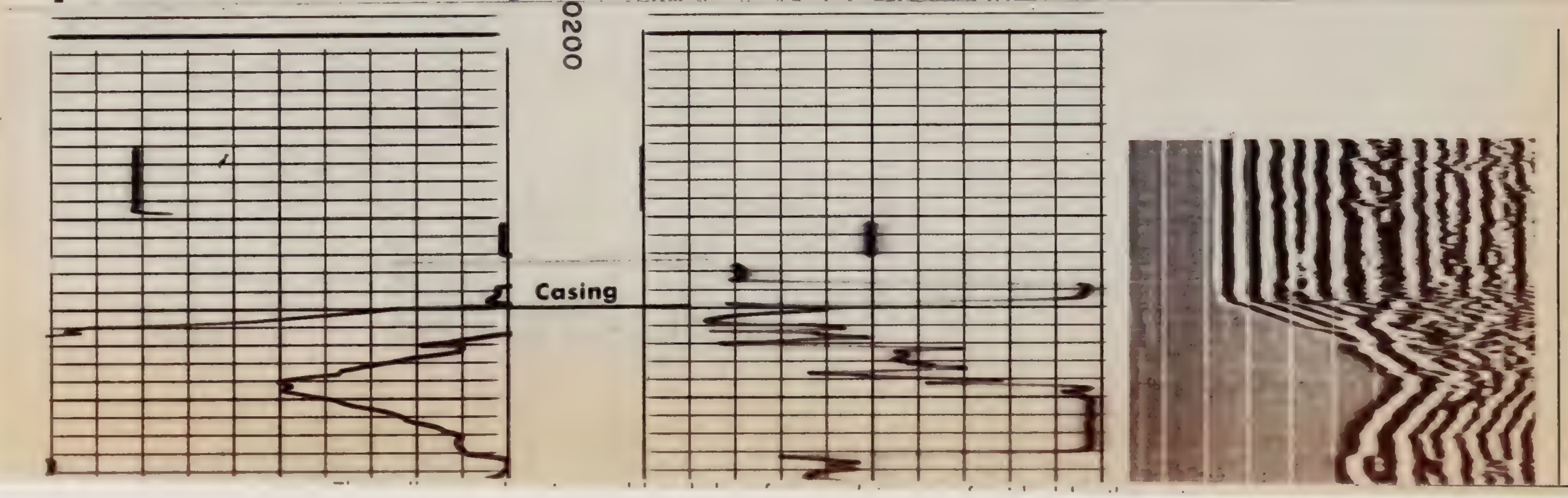
API Serial No. -

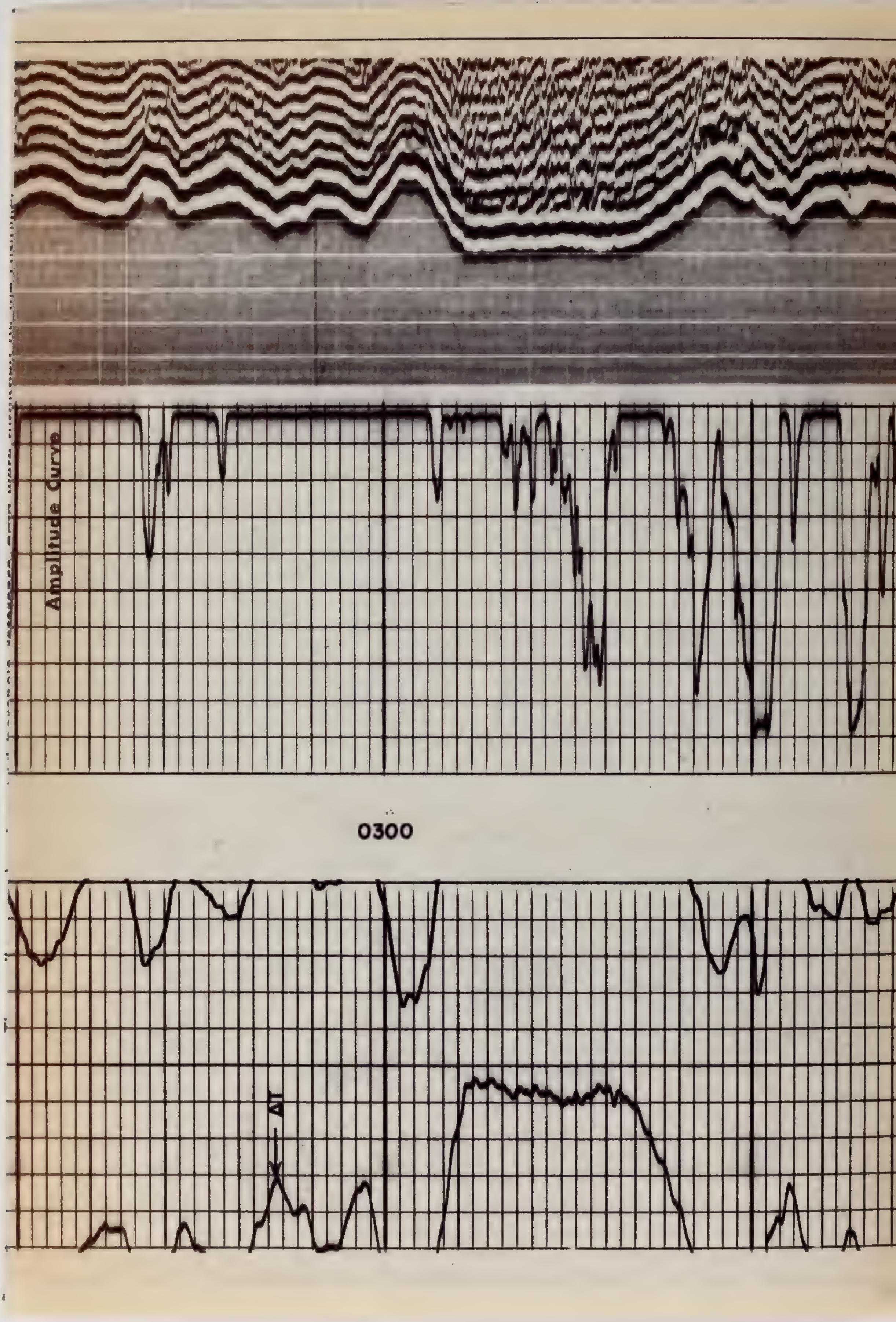
CALIBRATION DATA

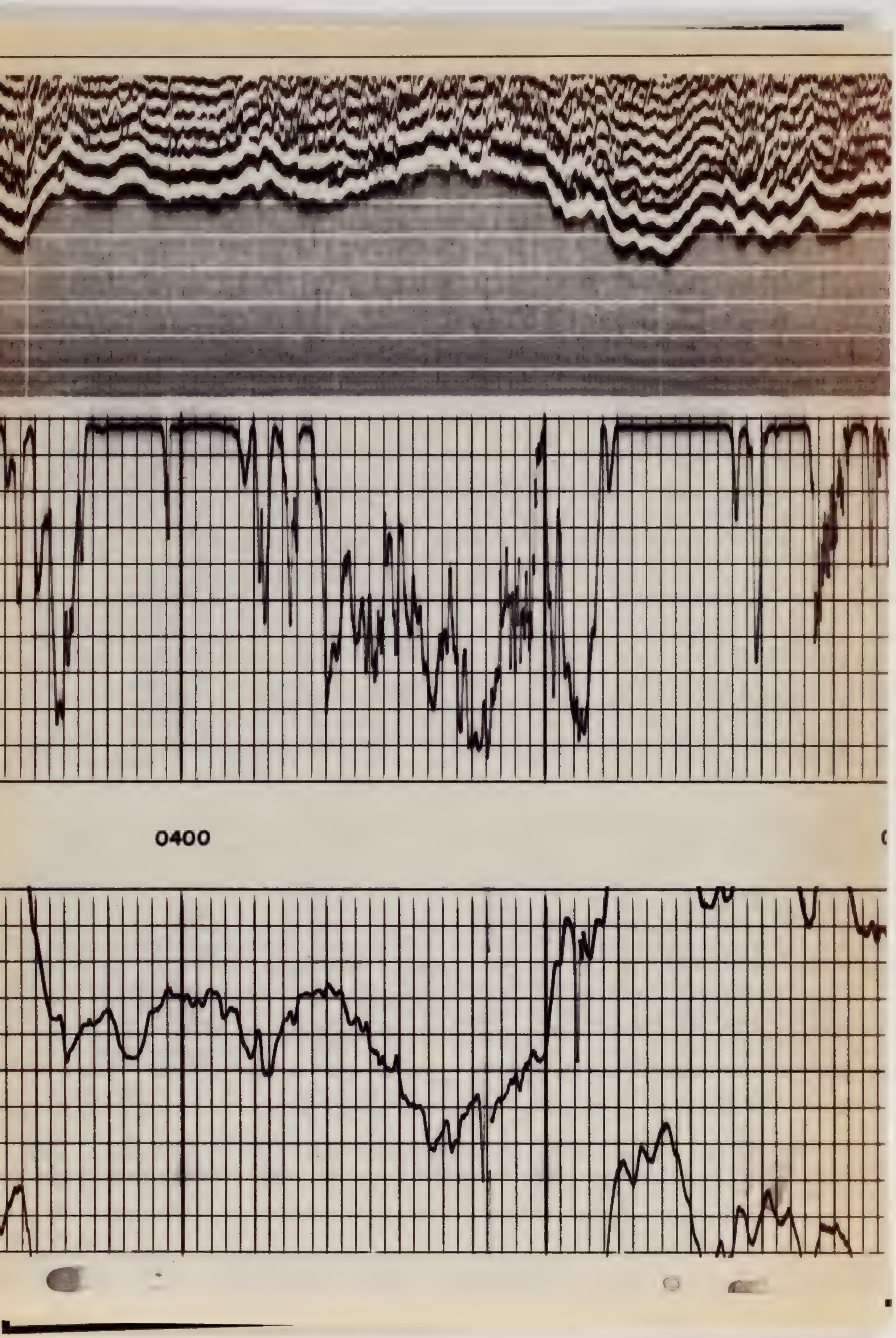
	CPS.	CPS.	DIVISION	(FOR CAL.)	(RECORD)	CONST.	
GAMMA RAY:							

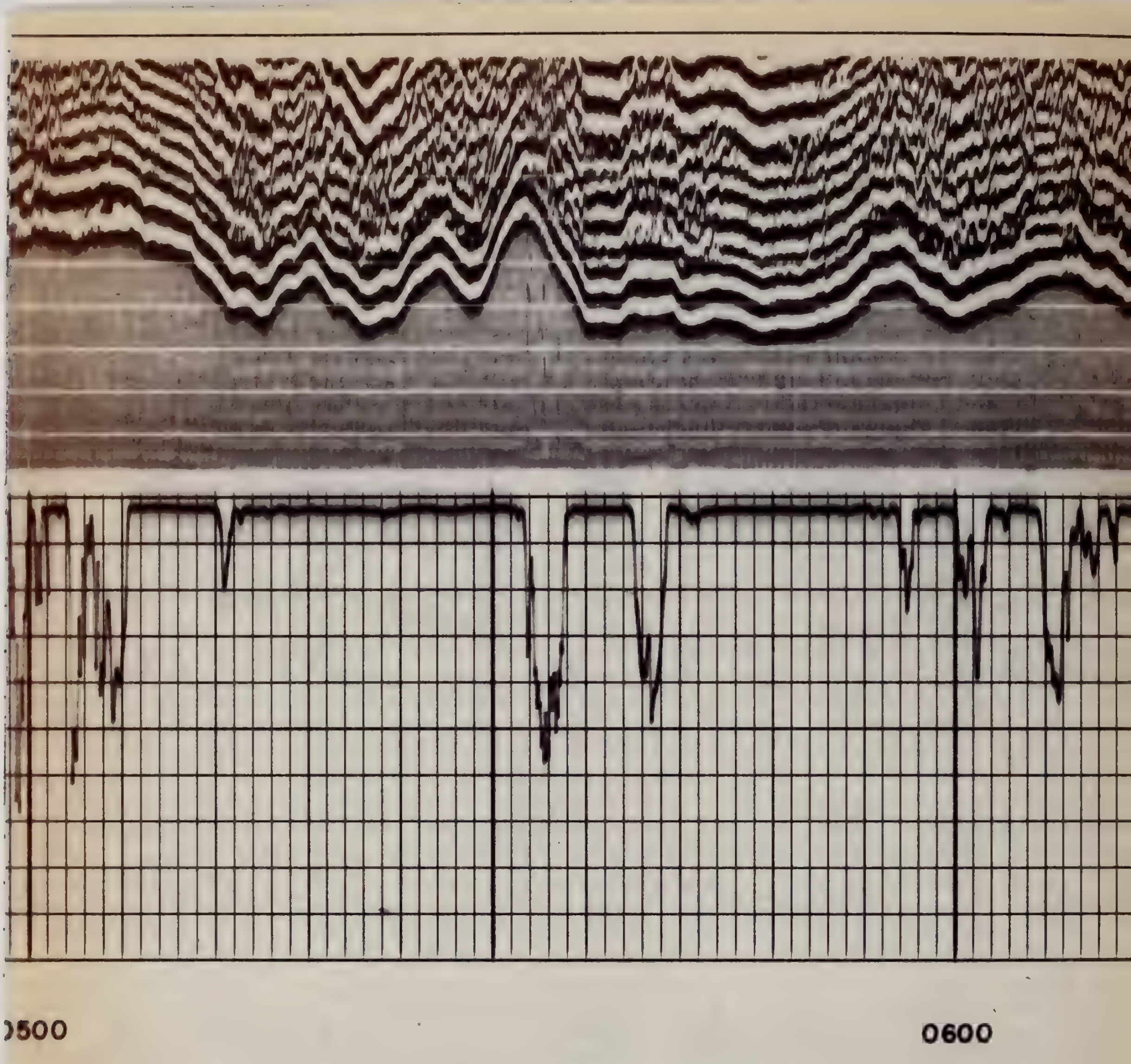
All interpretations are opinions based on inferences from electrical or other measurements and we cannot, and do not guarantee the accuracy or correctness of any interpretations, and we shall not, except in the case of gross or willful negligence on our part, be liable or responsible for any loss, costs, damages or expenses incurred or sustained by anyone resulting from any interpretation made by any of our officers, agents or employees. These interpretations are also subject to Clause 7 of our General Terms and Conditions as set out in our current Price Schedule.

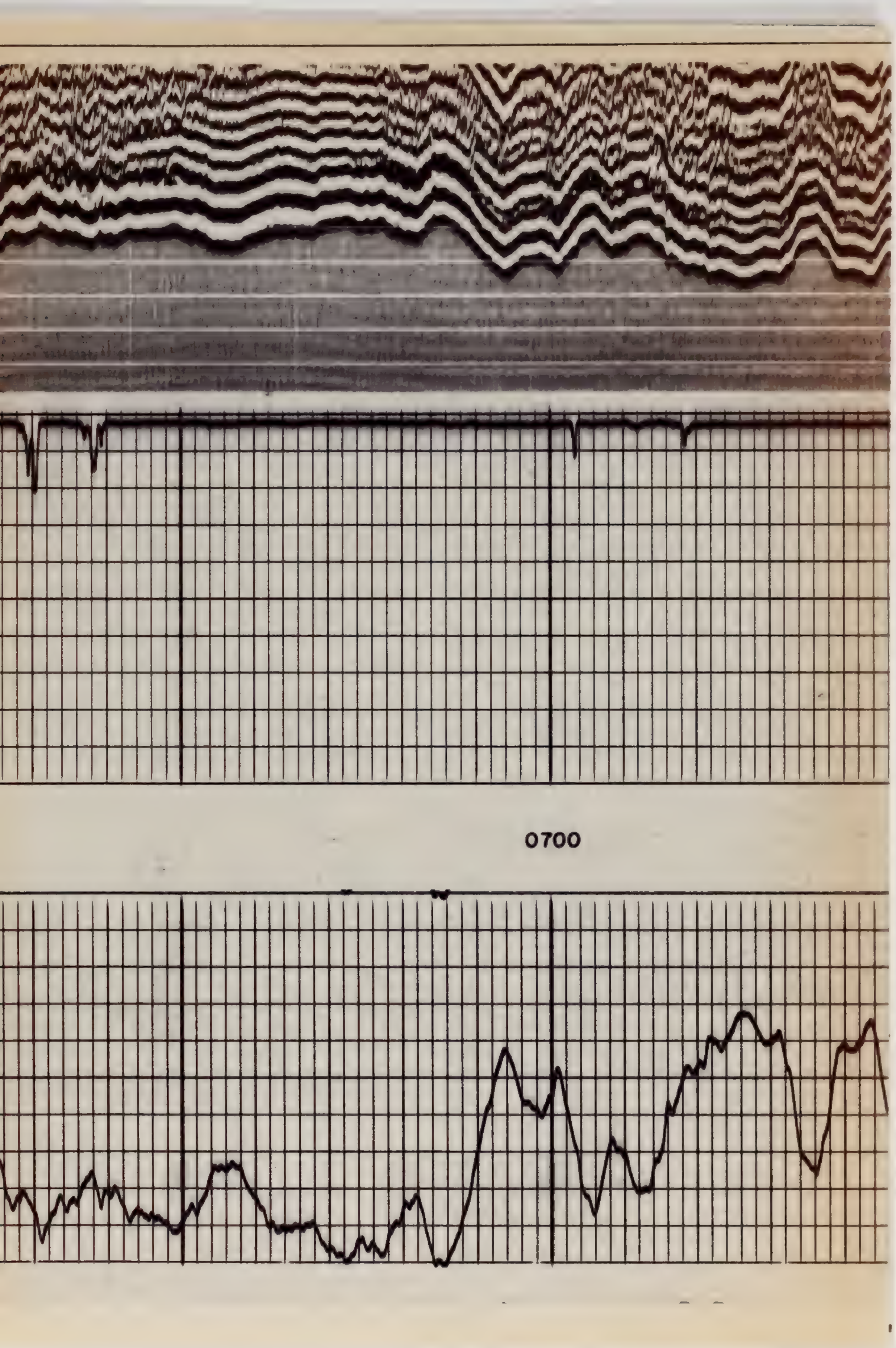
SINGLE RECIEVER DELTA-T		AMPLITUDE	VARIABLE DENSITY
600 400		0 20	200 1200
800 600			

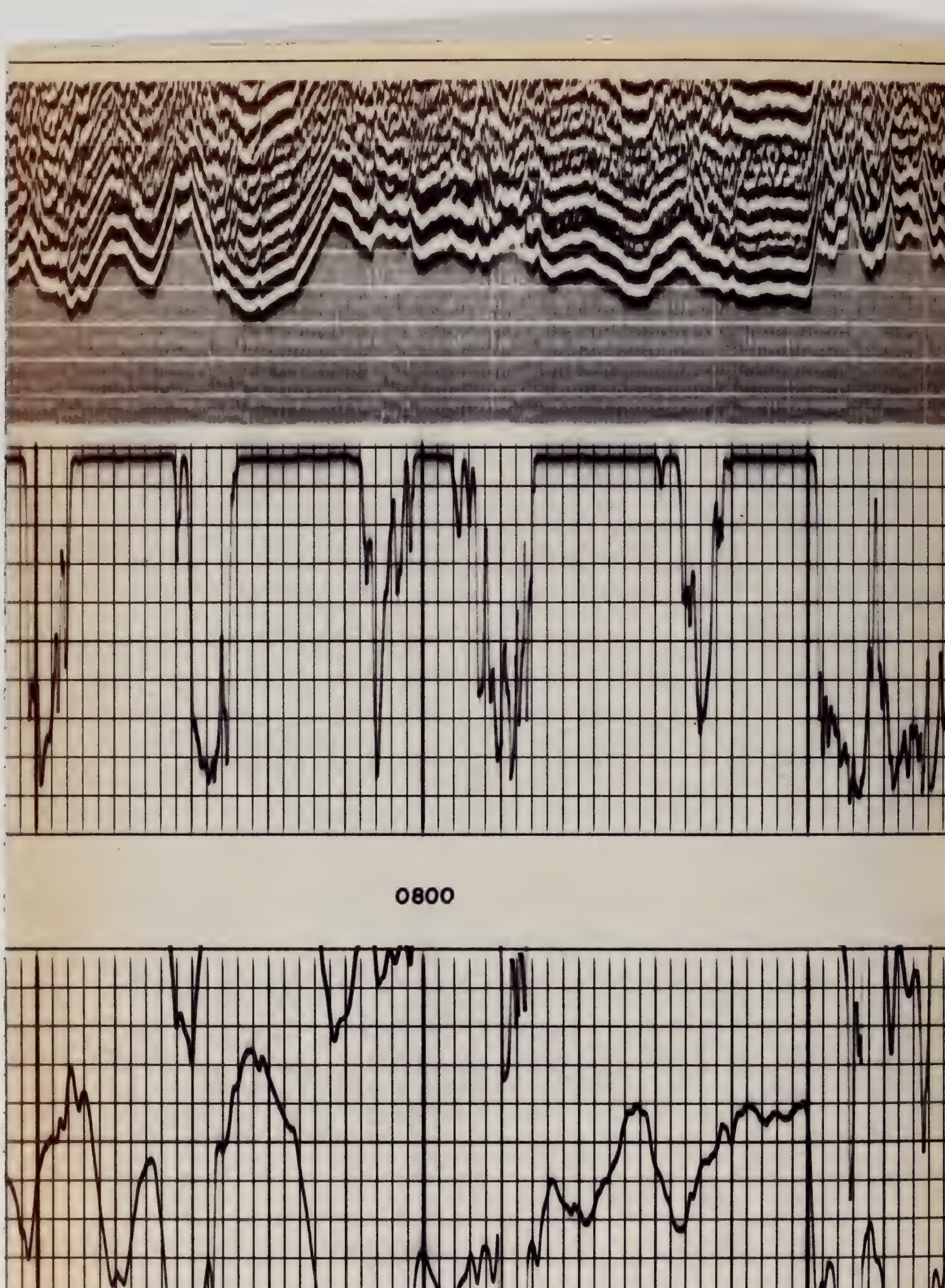



Amplitude Curve
0300
ΔT


0400


0500
0600


0700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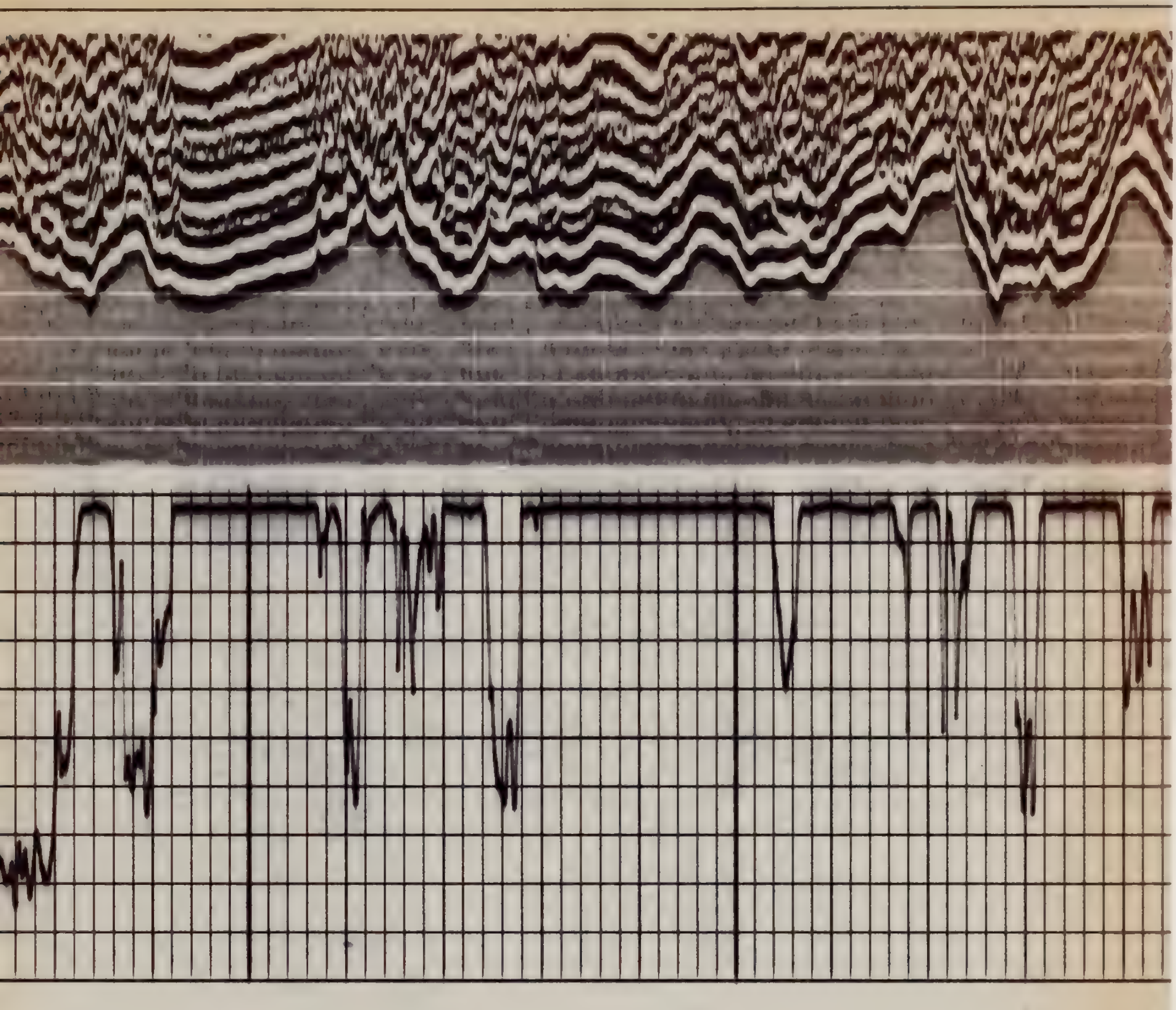
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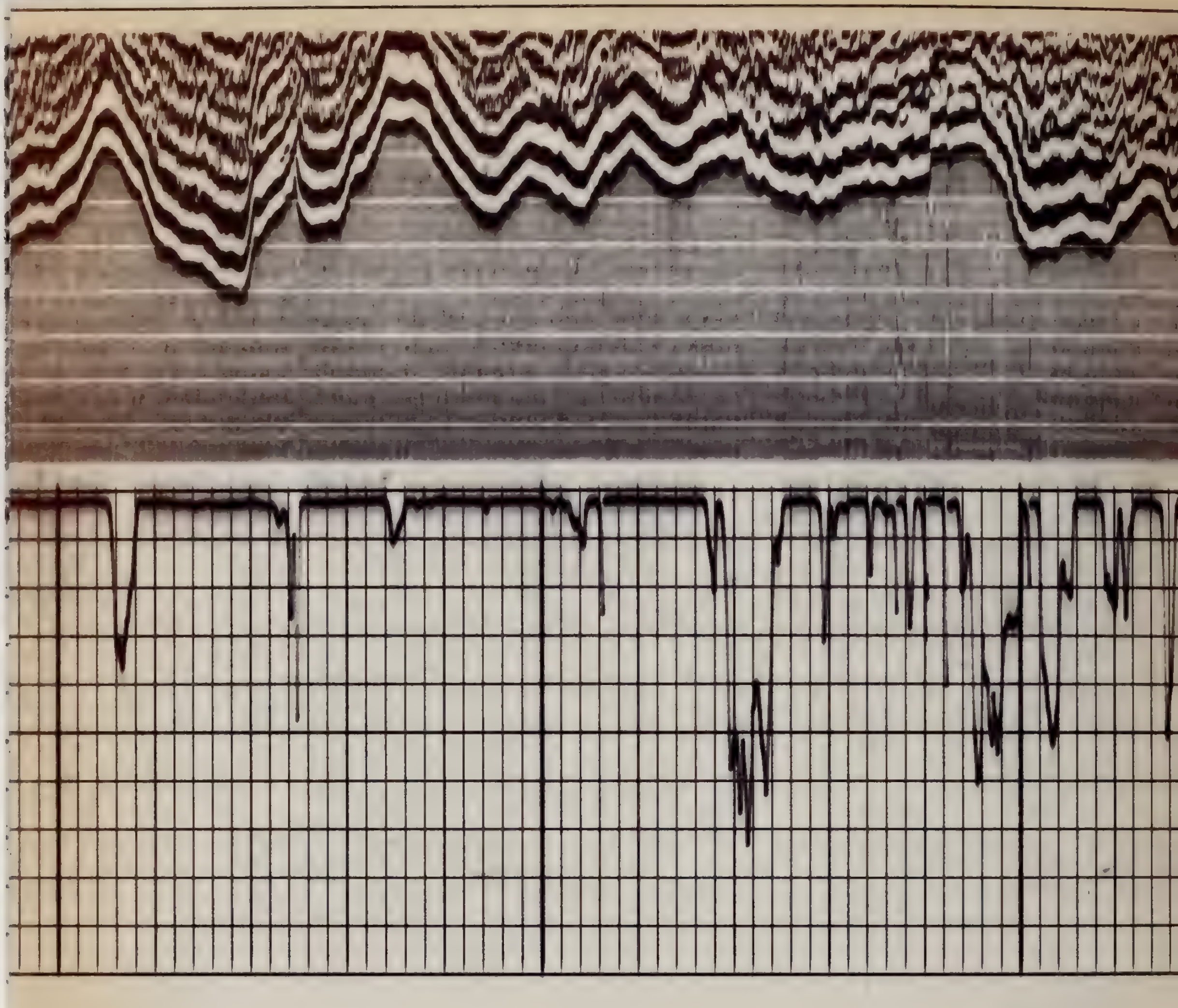
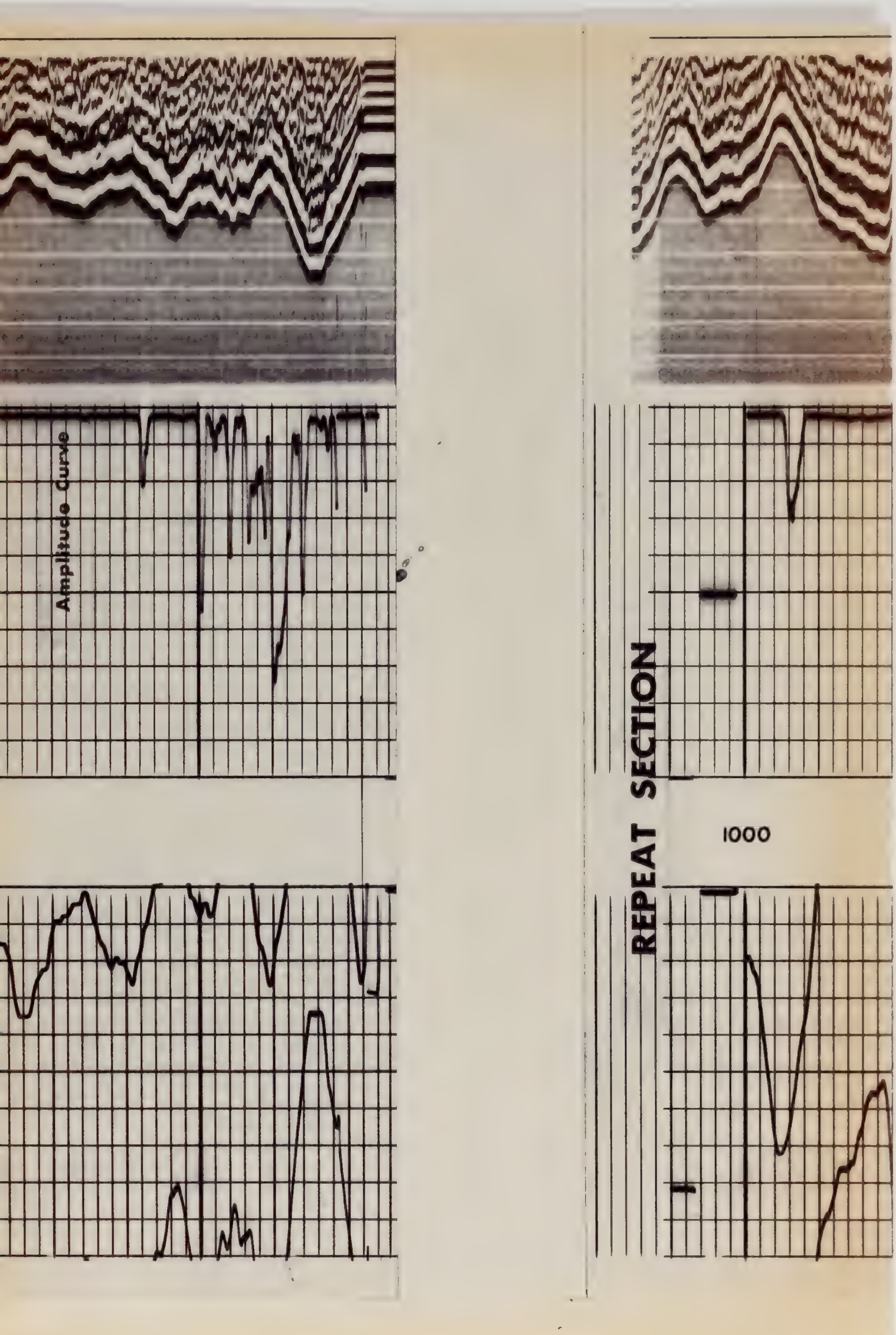
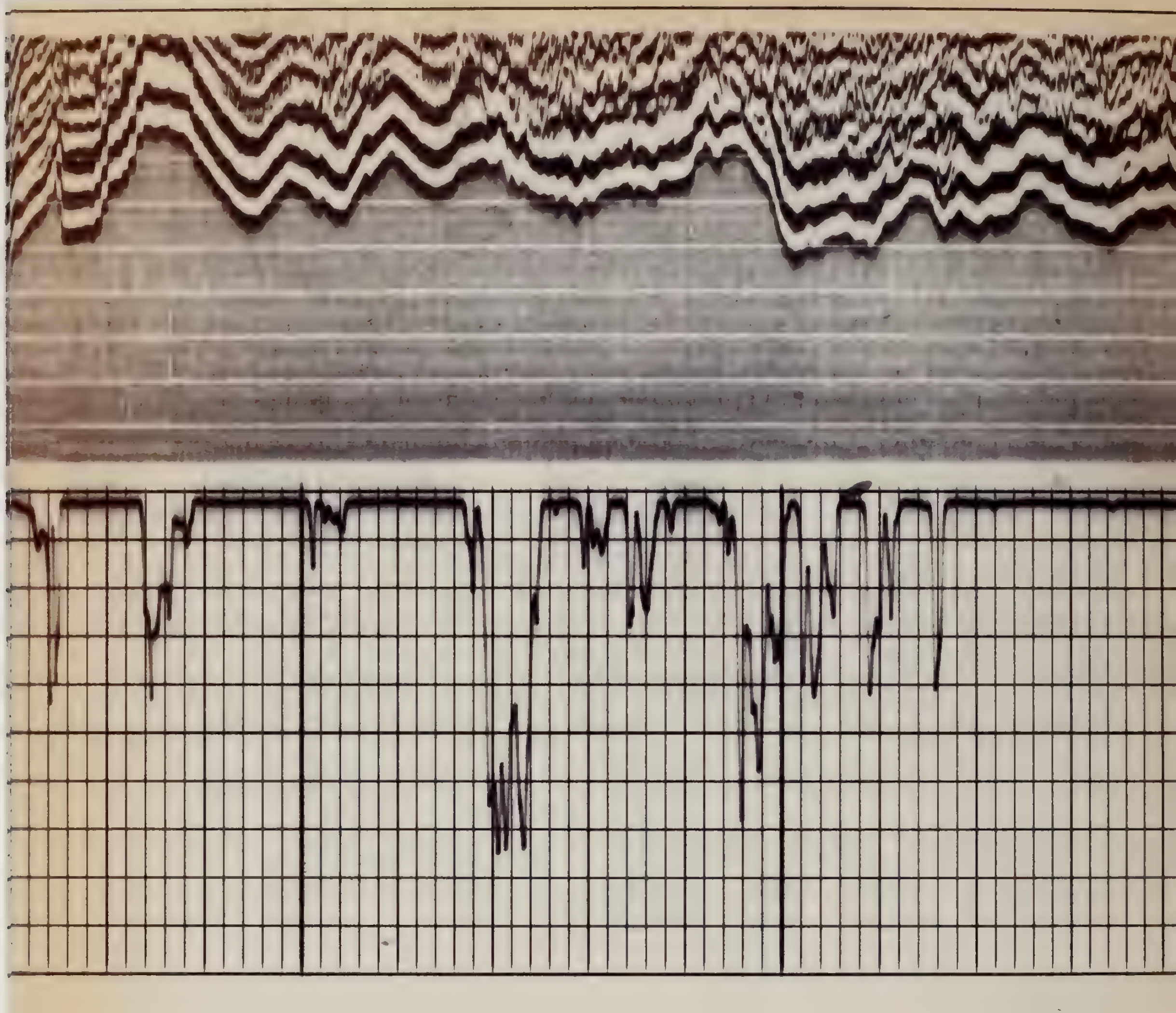
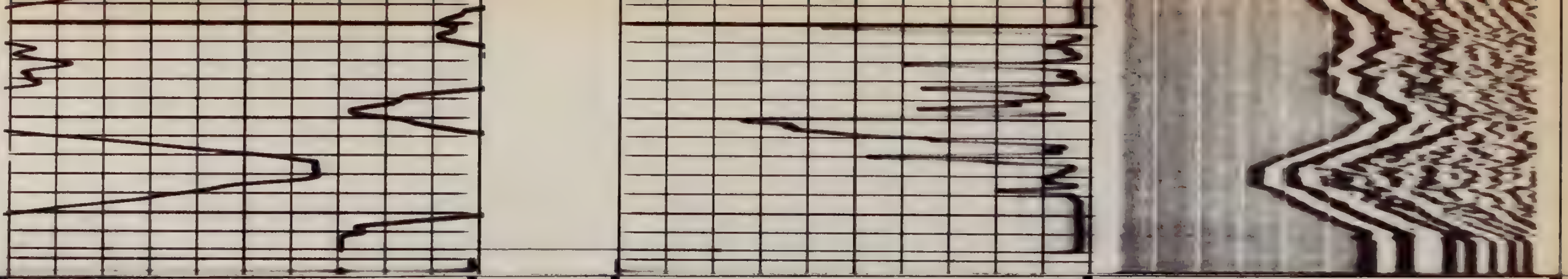

1000
1100
ΔT


Amplitude Curve
REPEAT SECTION
1000


1100



SINGLE RECIEVER DELTA-T	DEPTHS	AMPLITUDE	VARIABLE DENSITY
600 — 400 800 — 600		0 — 20	200 — 1200

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH 1-A

SCHL FR 1173
SCHL TD 1182
DRLR TD 1180

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

Elev:
KB
DF
GL

Schlumberger

TEMPERATURE LOG

COUNTY RIO BLANCO
FIELD or LOCATION SORGHUM GULCH
WELL SORGHUM GULCH 1-A
COMPANY ATLANTIC RICHFIEL

COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH 1-A

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO

LOCATION

Sec. 2 Twp. 3S Rge. 97W

Other Services:
BHC/FDC-GR
LL-7
AMP-VDL

Permanent Datum: GL ; Elev.:
og Measured From GL , 0 Ft. Above Perm. Datum
rilling Measured From GL

Elev.: K.B.
D.F.
G.L.

ate	2-1-75		
un No.	ONE		
epth—Driller	1180		
epth—Logger	1180		
tm. Log Interval	1180		
op Log Interval	SURF		
asing—Driller	7 @ 230	@	@
asing—Logger	230		
asing Size 1	To	To	To
2	To	To	To
asing Weight 1			
2			
asing Thickness 1			
2			
it Size 1	6-1/4 To 1180	To	To
2	To	To	To
ype Fluid in Hole	FORMATION WATER		
Dens. | Visc.	|	|	|
ime Since Circ.			
HT			
Equip. | Location	5602 | GJ	|	|
ecorded By	GEIGER		
itnessed By			

FOLD HERE

The well name, location and borehole reference data were furnished by the customer.

Elev:

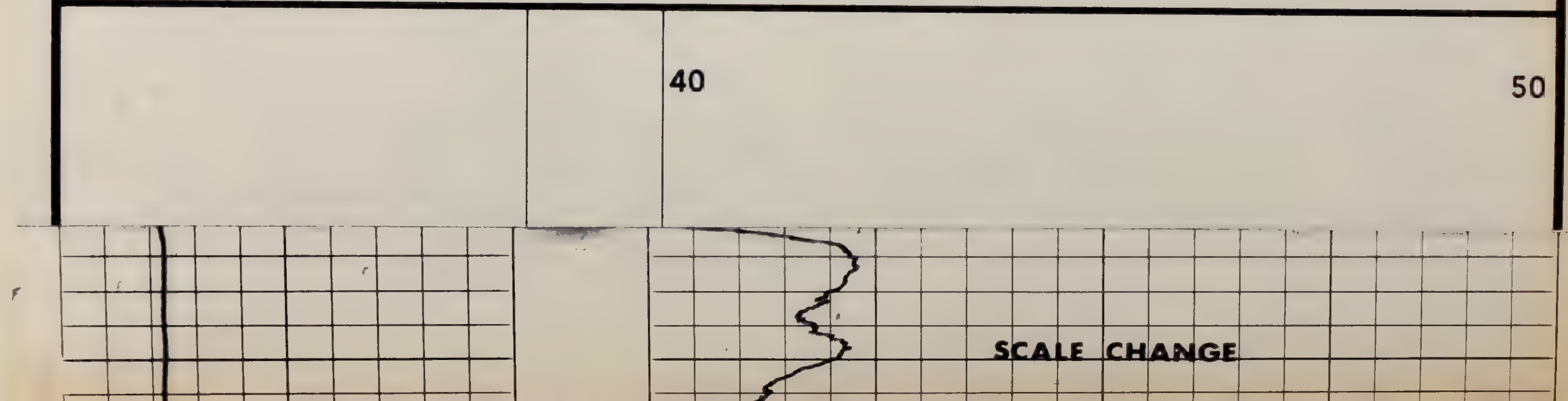
REMARKS: SO# 22443
HRT FROM FT. MORGAN

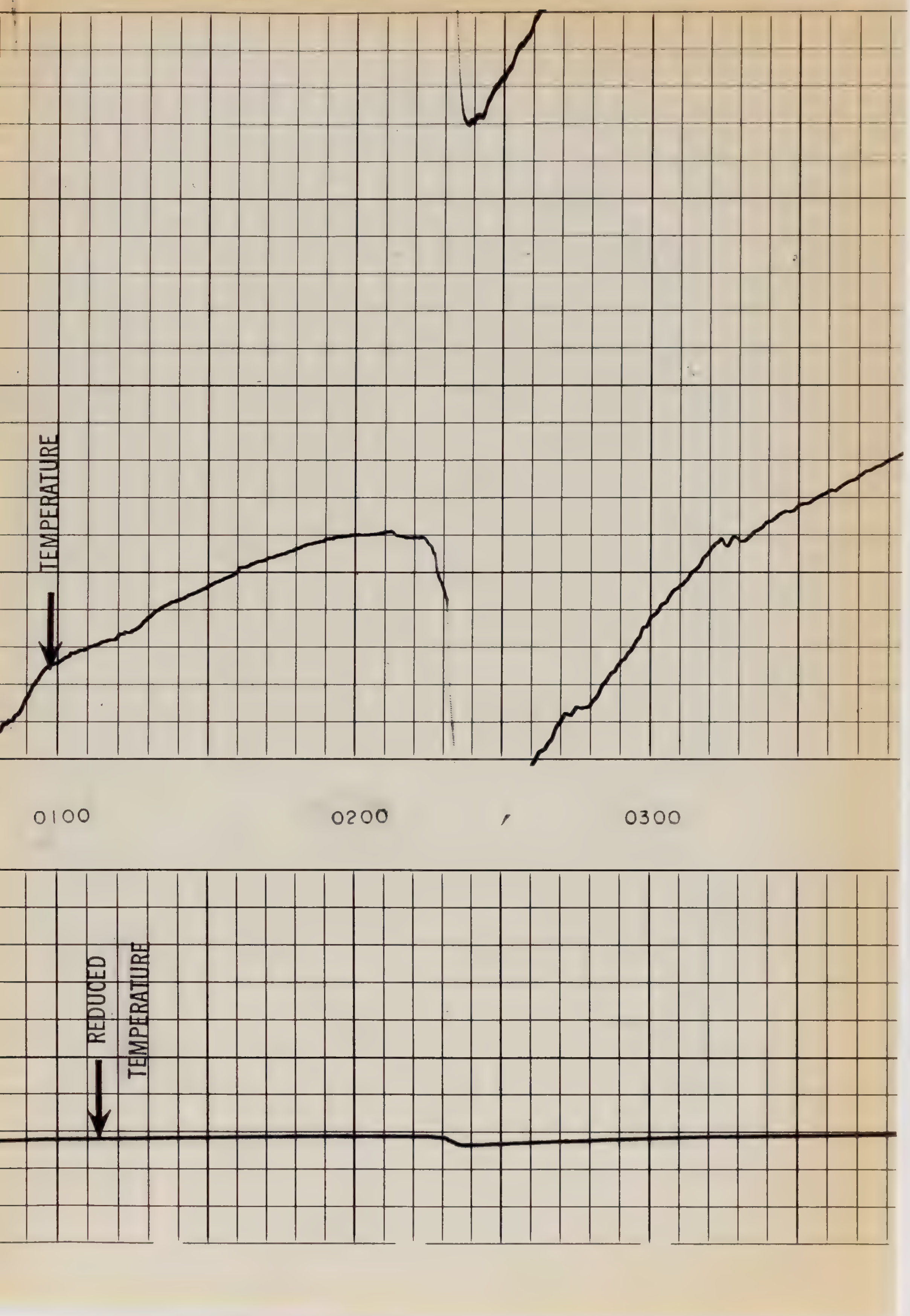
CEMENTATION DATA

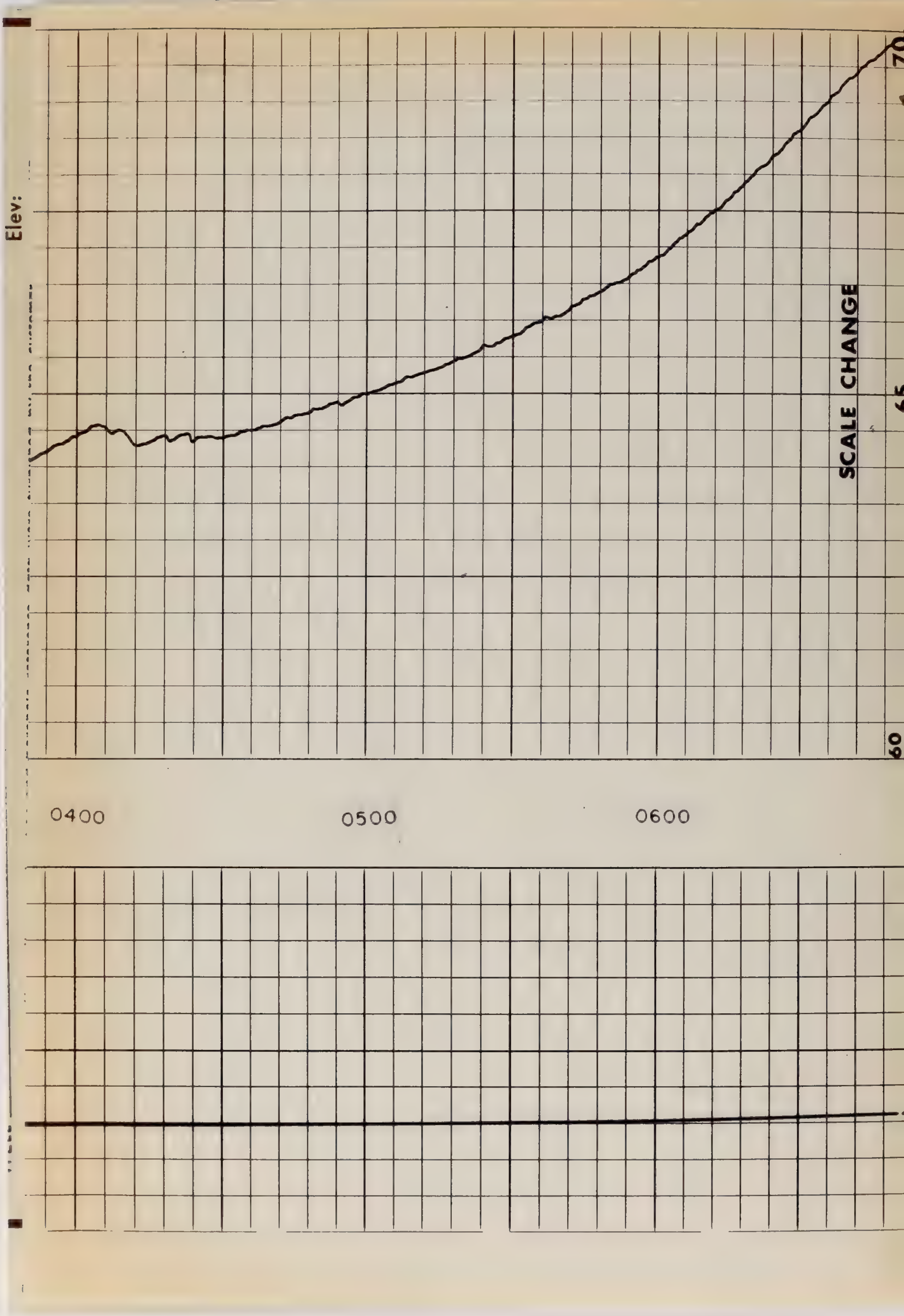
Date	Depth	Type of Cement	Nb of Sacks	Additives	Calculated Top

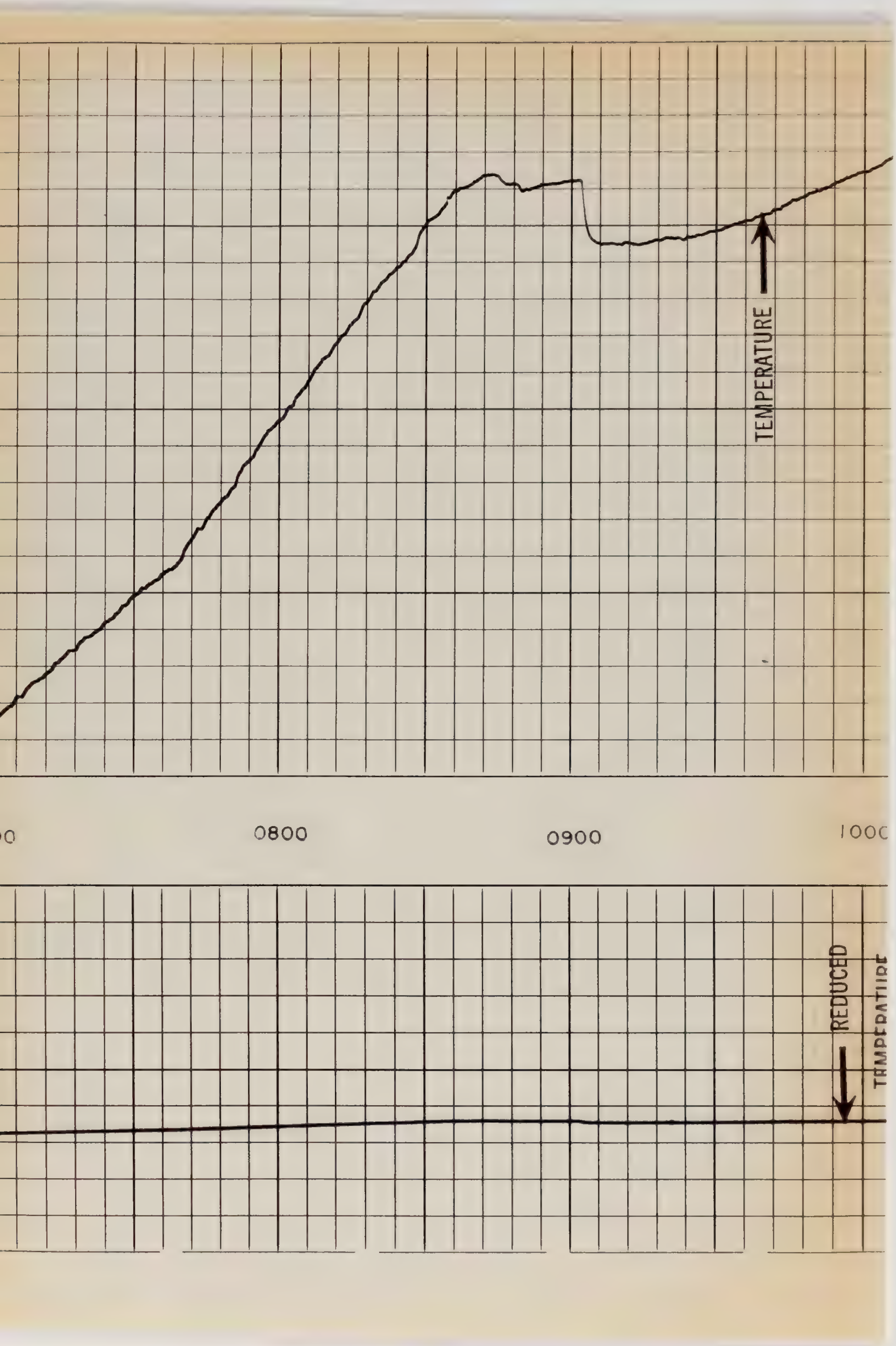
REDUCED SENSITIVITY
TEMPERATURE

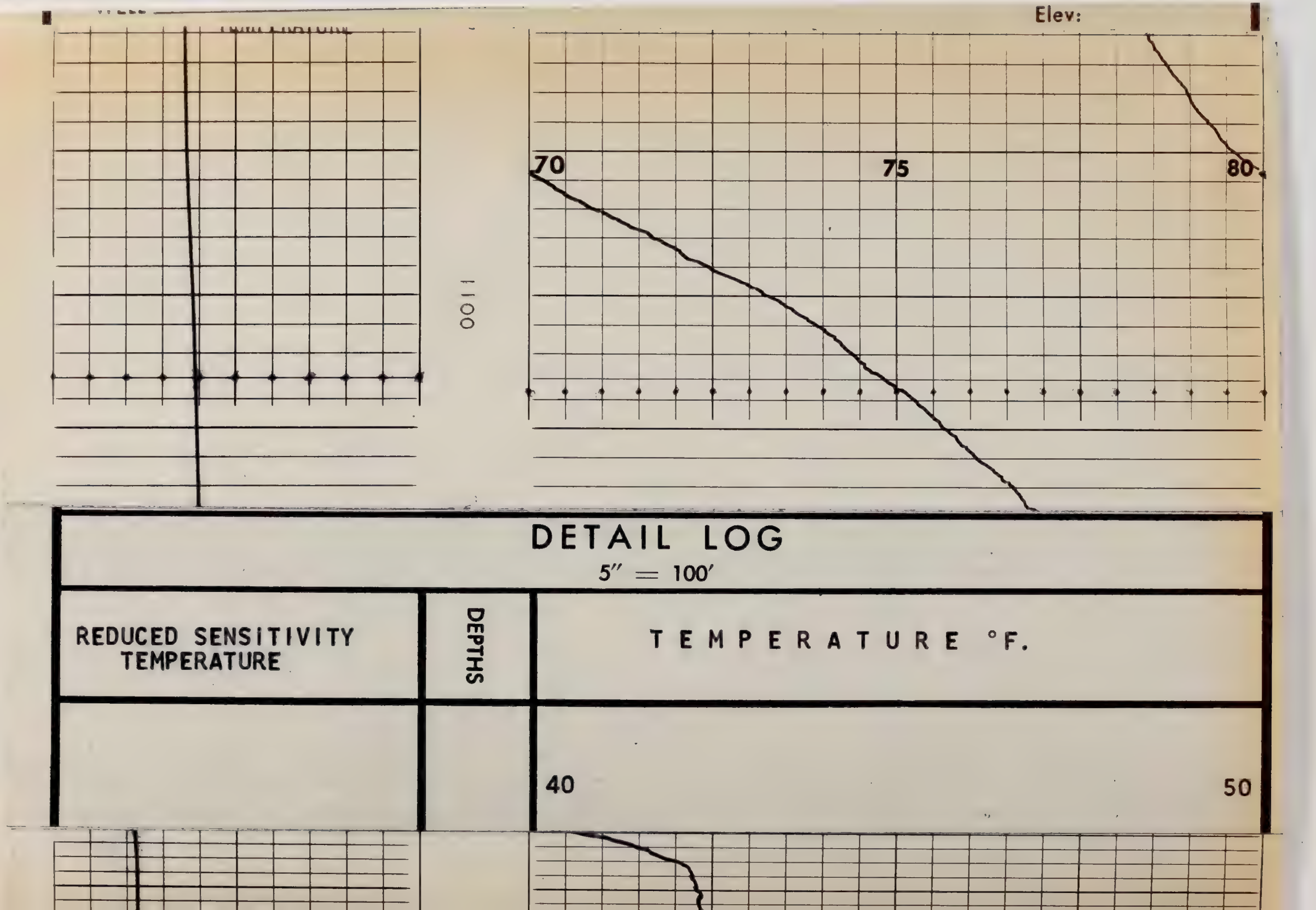
TEMPERATURE °F.

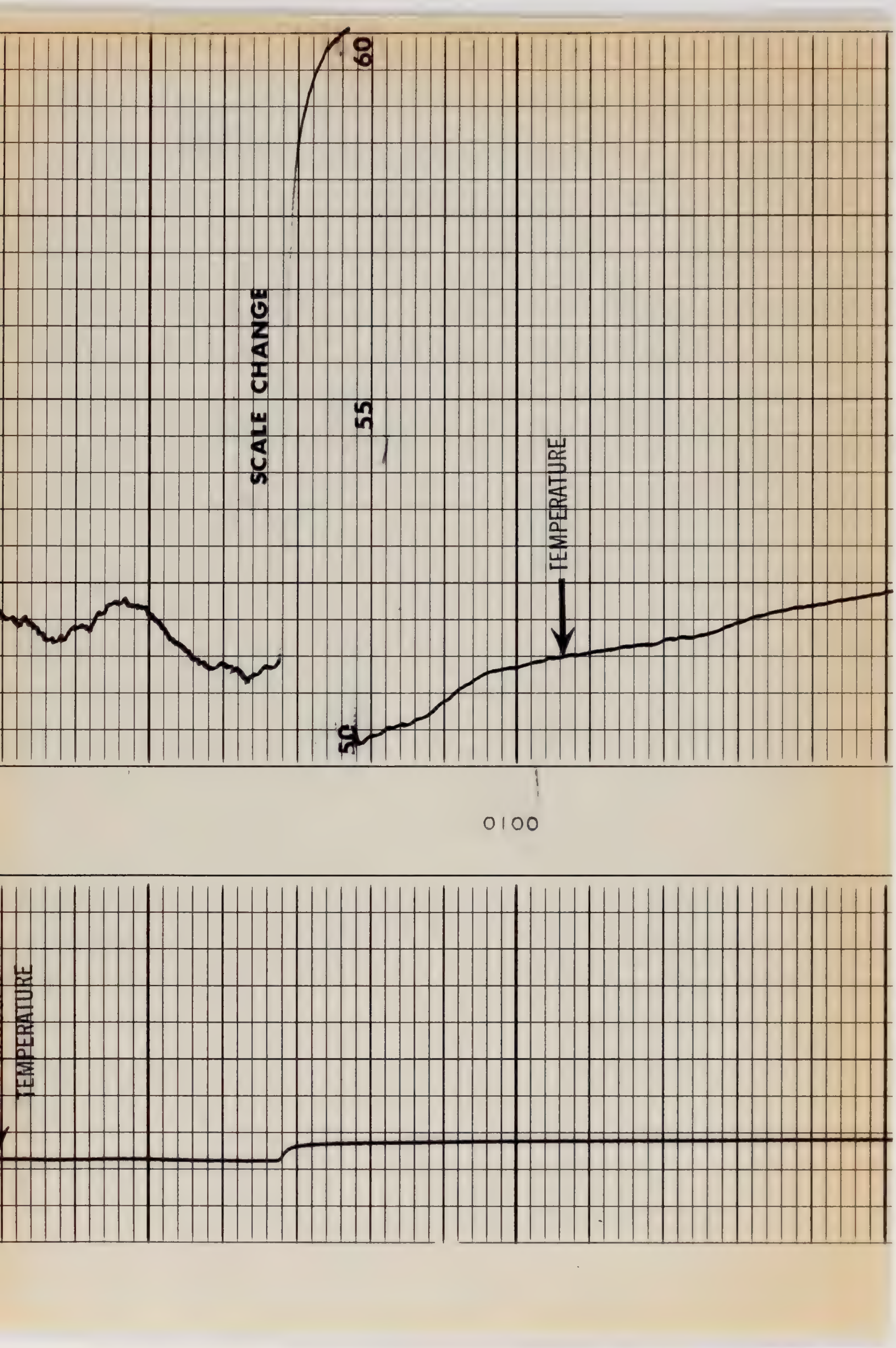


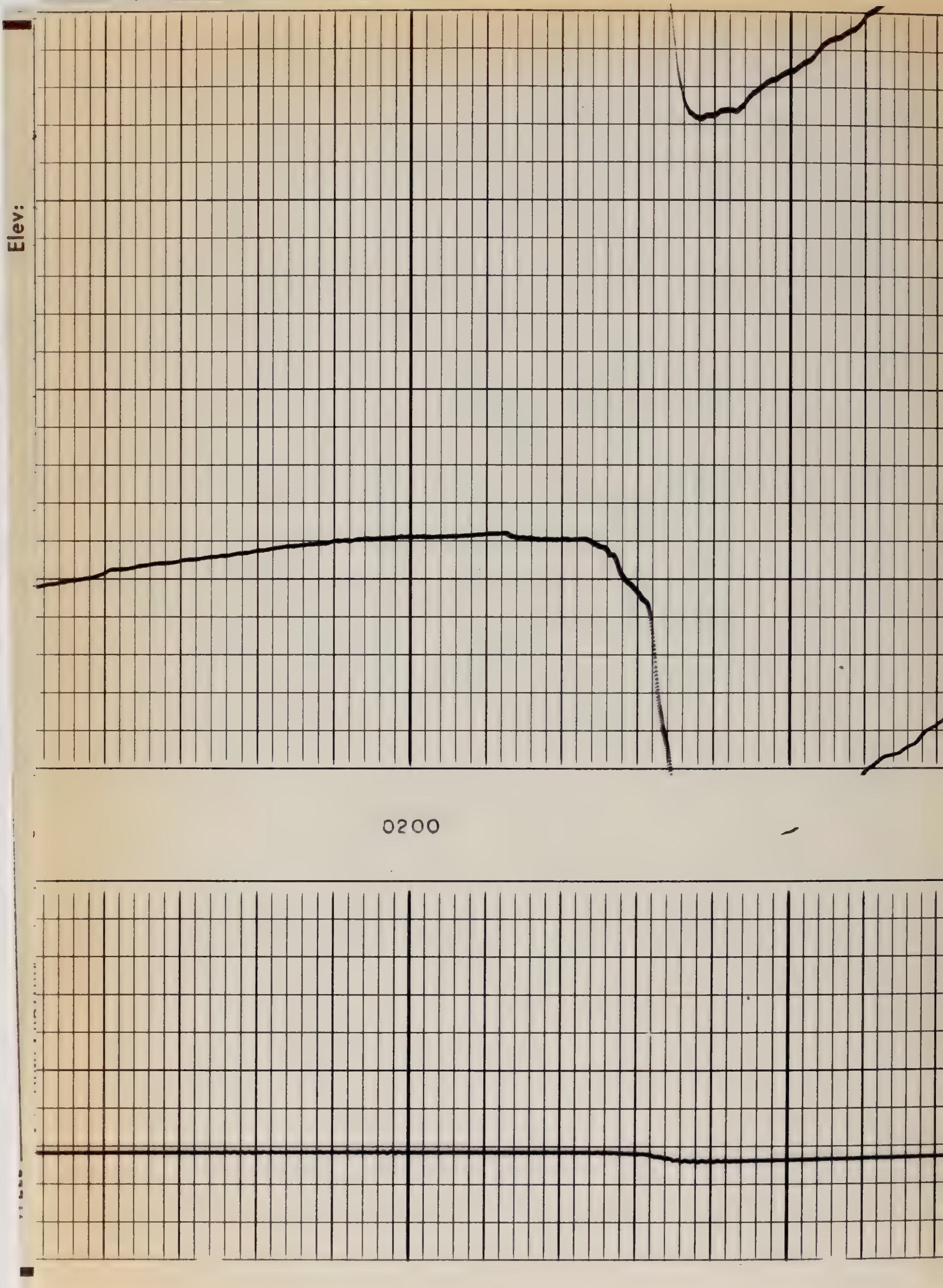

TEMPERATURE
0100
0200
0300
REDUCED
TEMPERATURE

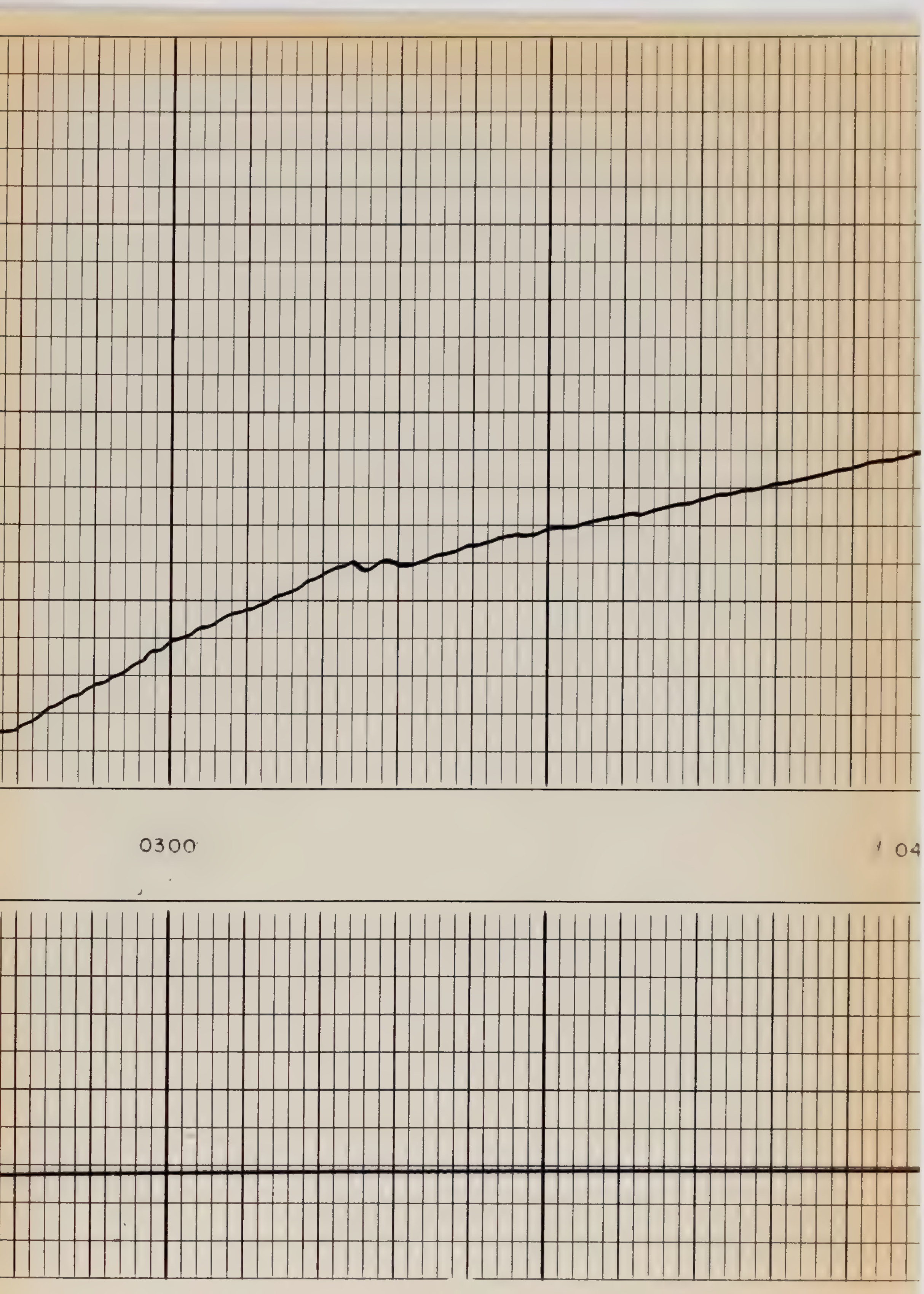

Elev:
SCALE CHANGE
70
65
60
0400
0500
0600

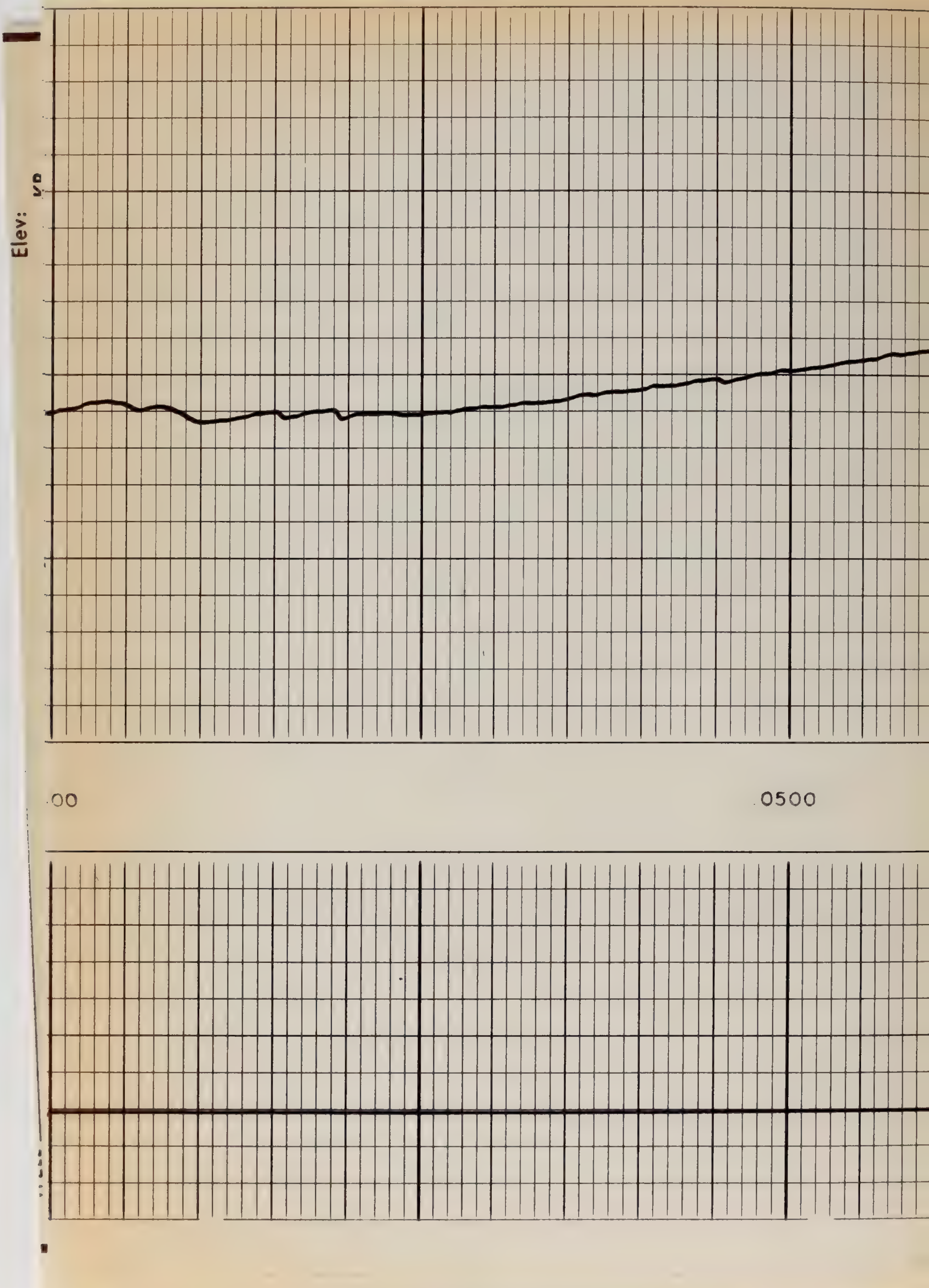

TEMPERATURE
0800
0900
1000
REDUCED TEMPERATURE

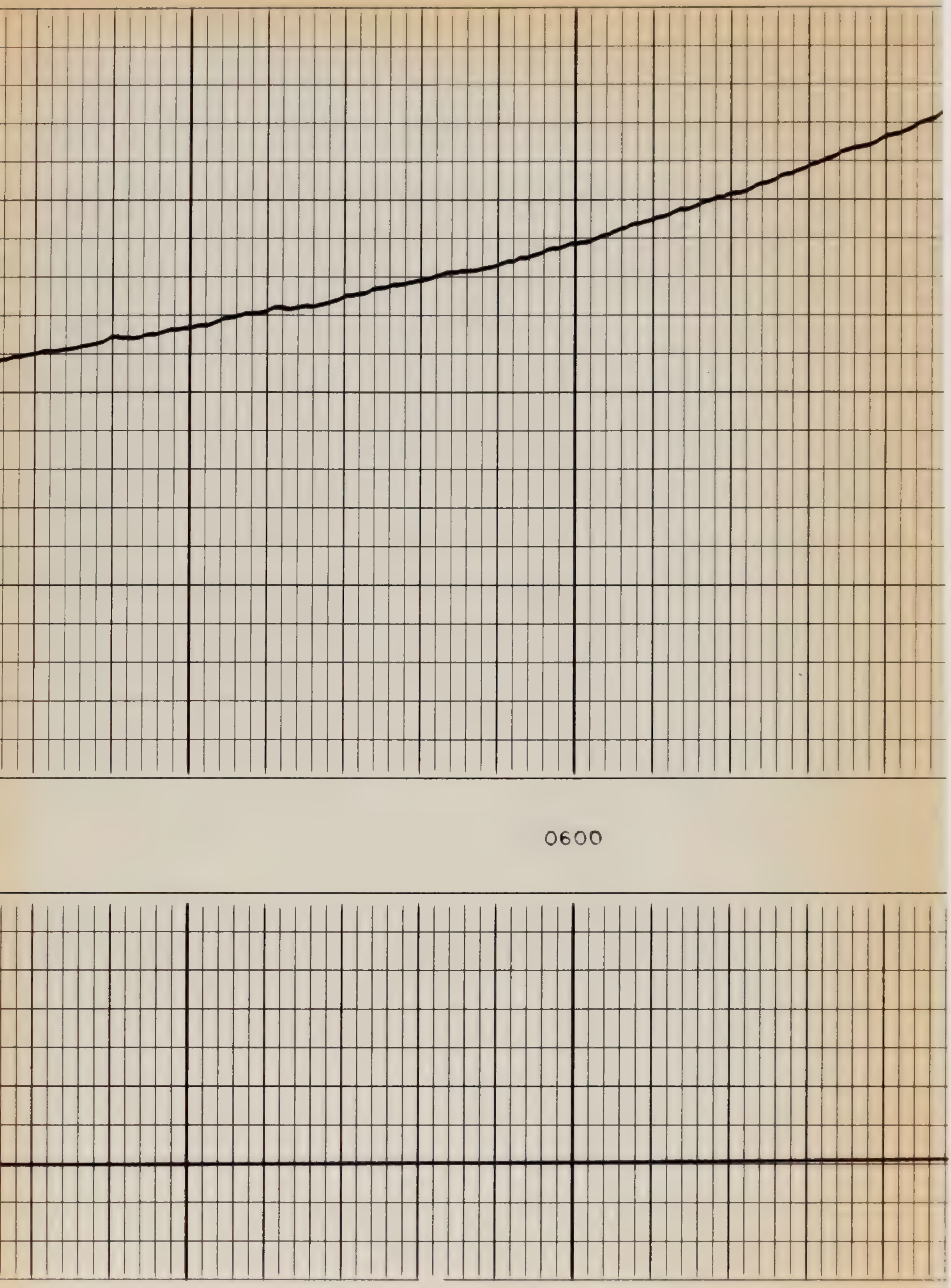

Elev:
70
75
80
1100
DETAIL LOG
5″ = 100′
REDUCED SENSITIVITY TEMPERATURE
DEPTHS
TEMPERATURE °F.
40
50


SCALE CHANGE
60
55
50
TEMPERATURE
0100
TEMPERATURE


Elev:
0200


0300
04


Elev:
.00
0500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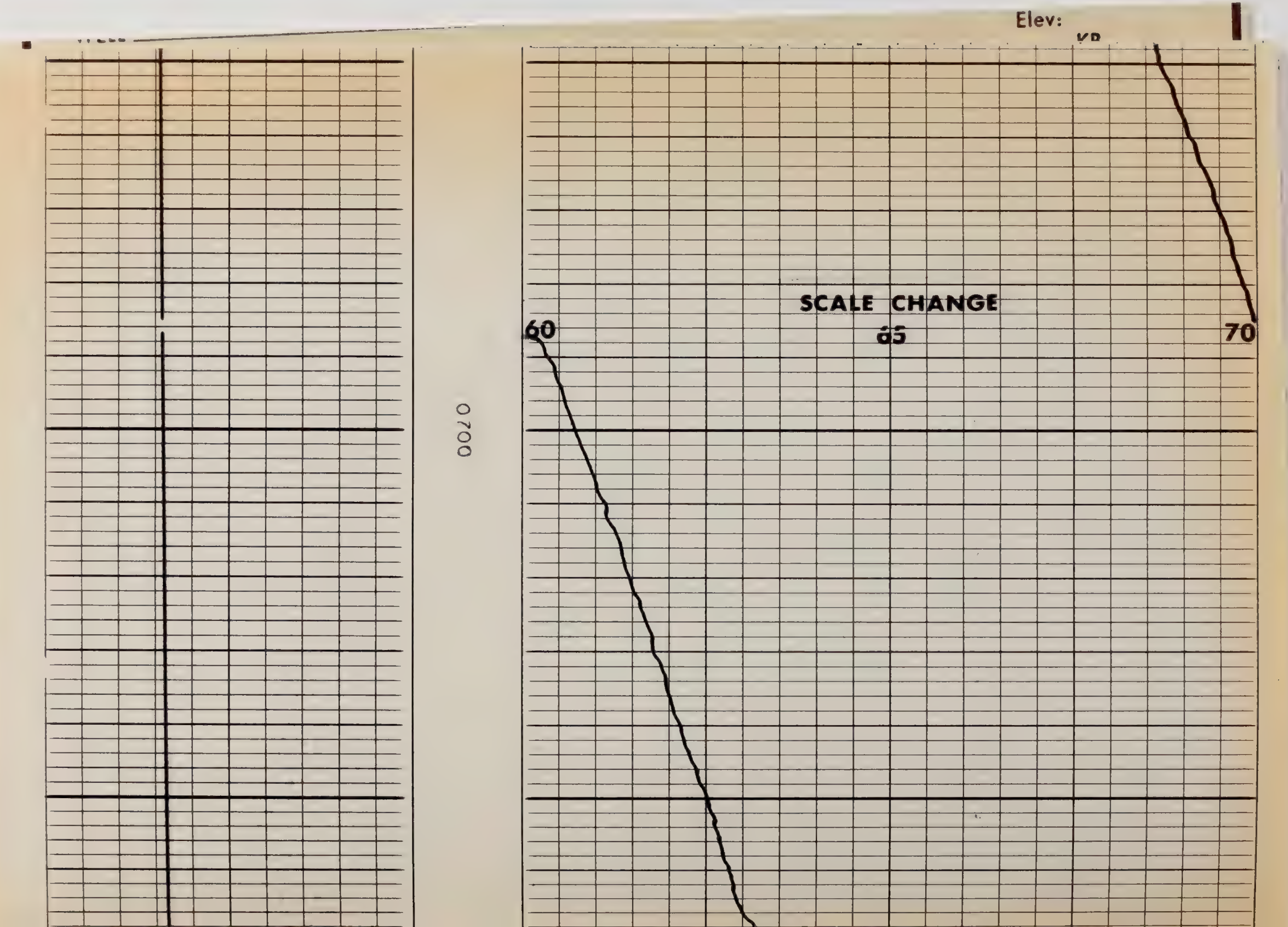
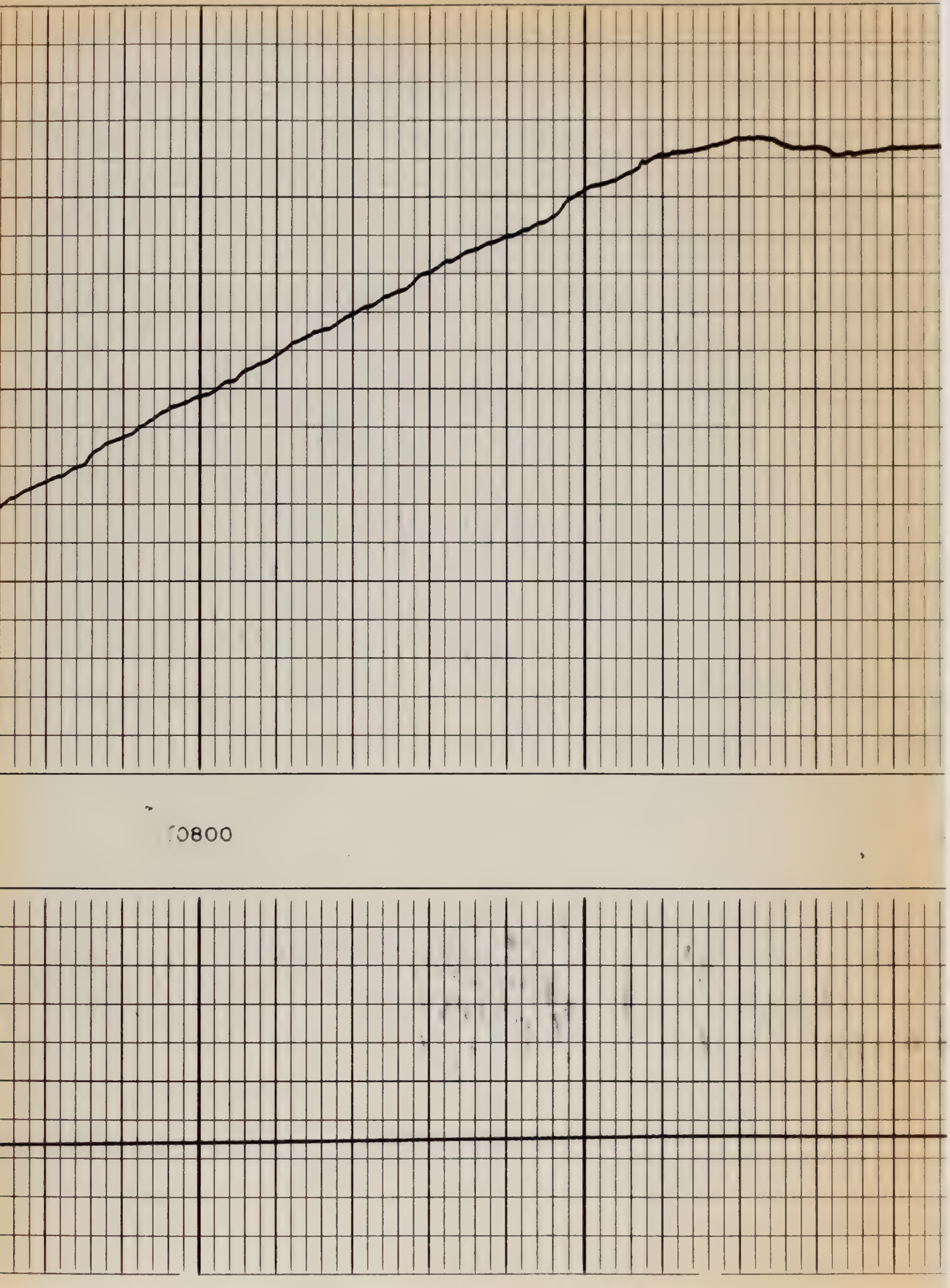
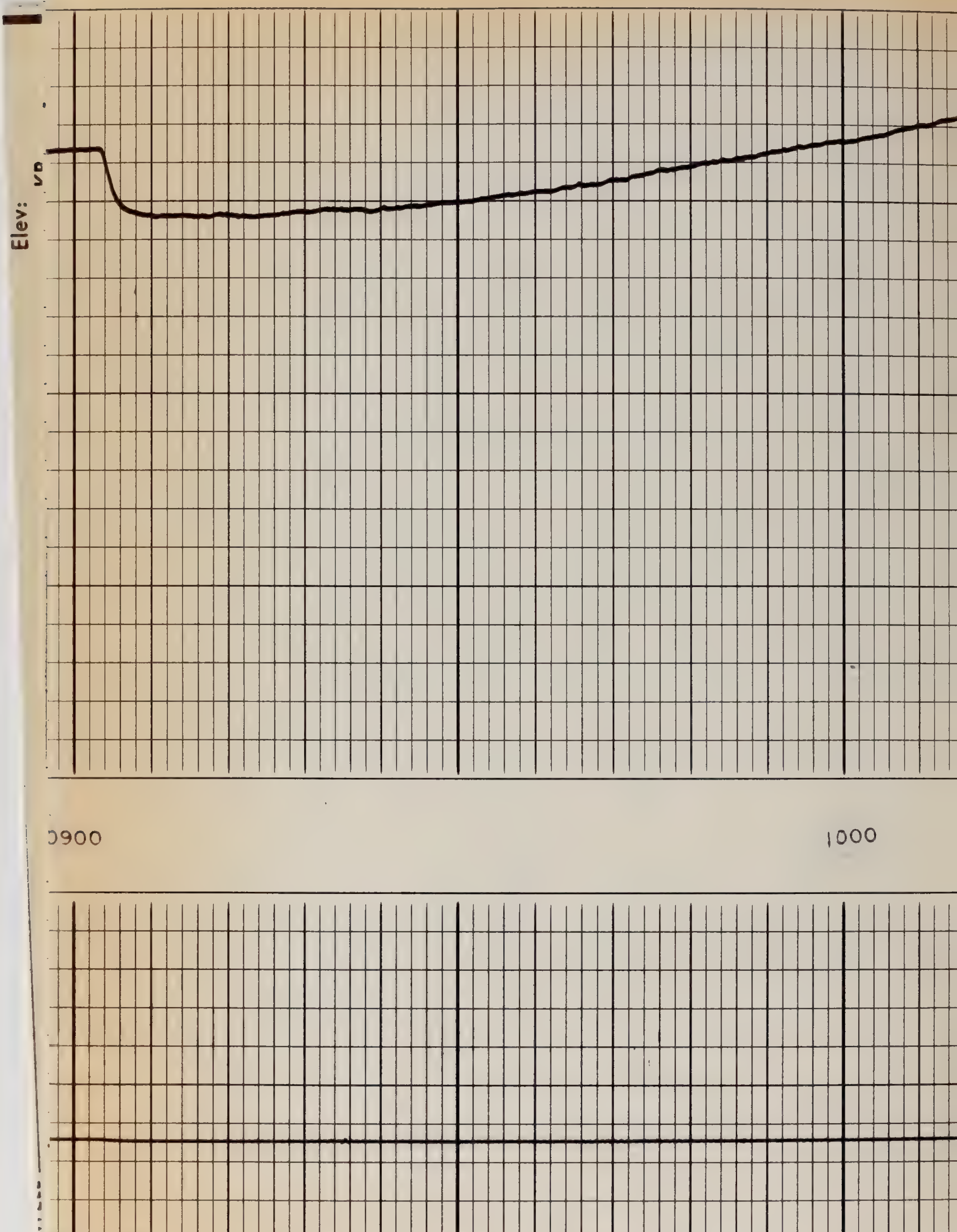
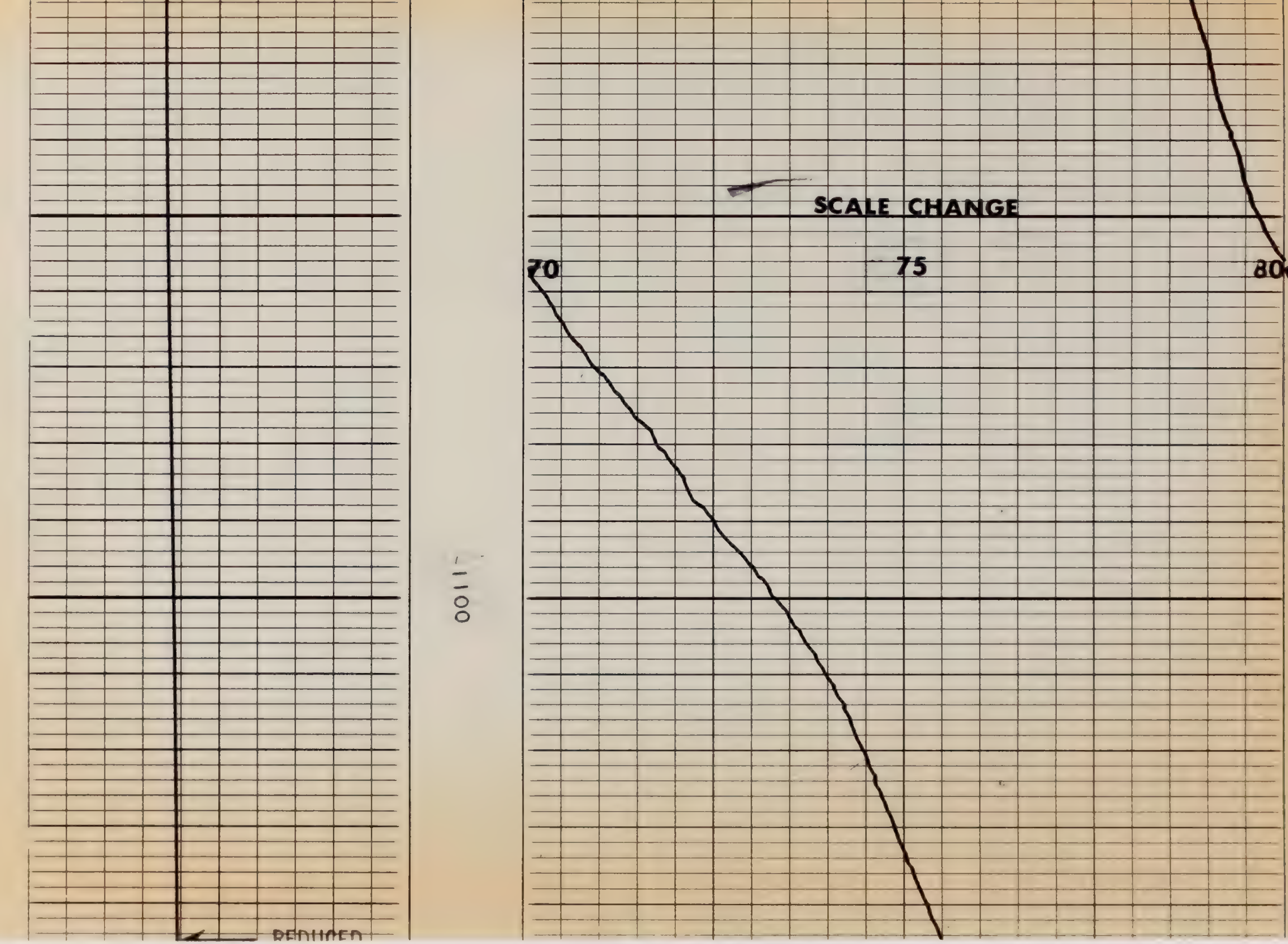
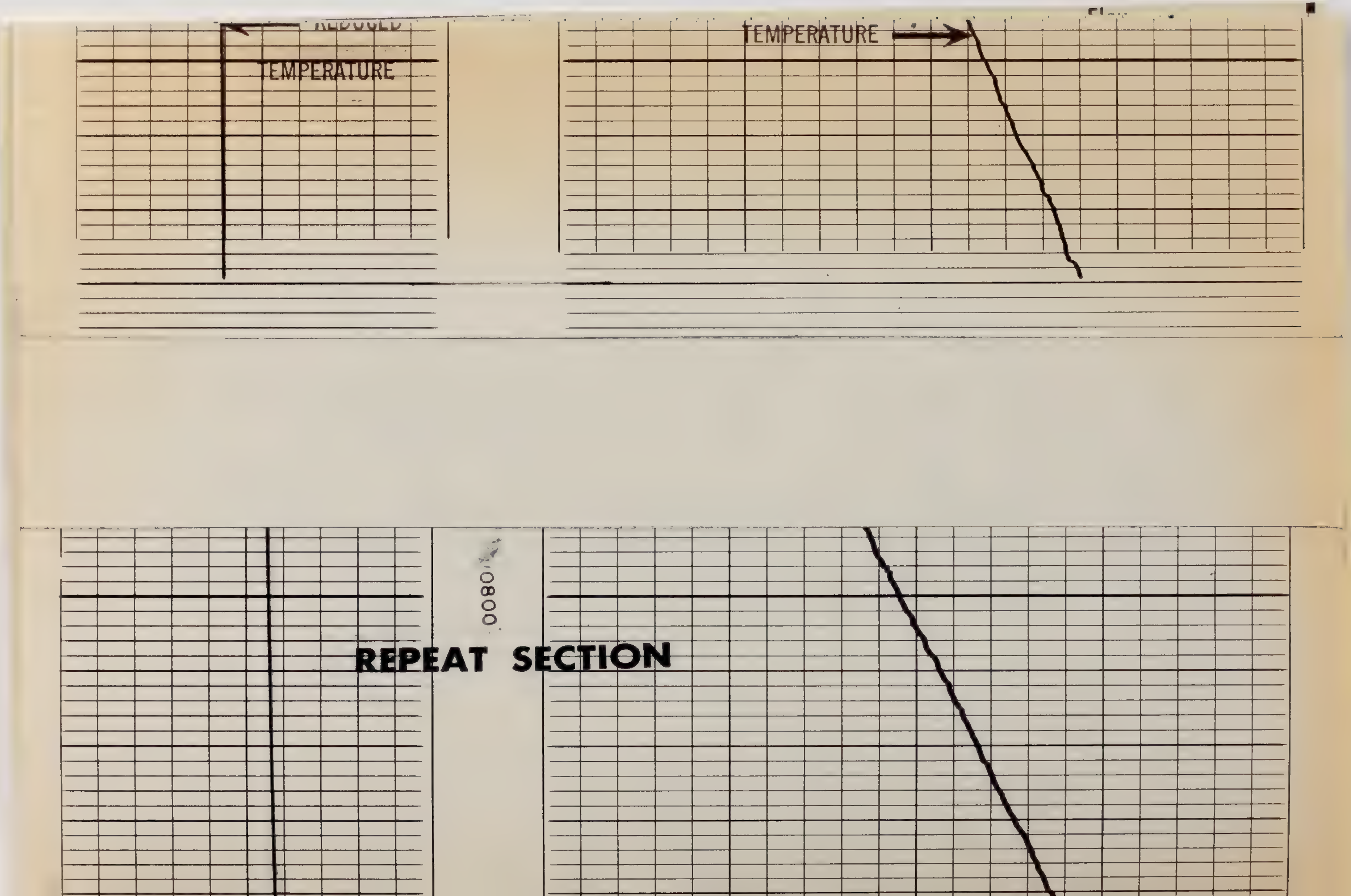
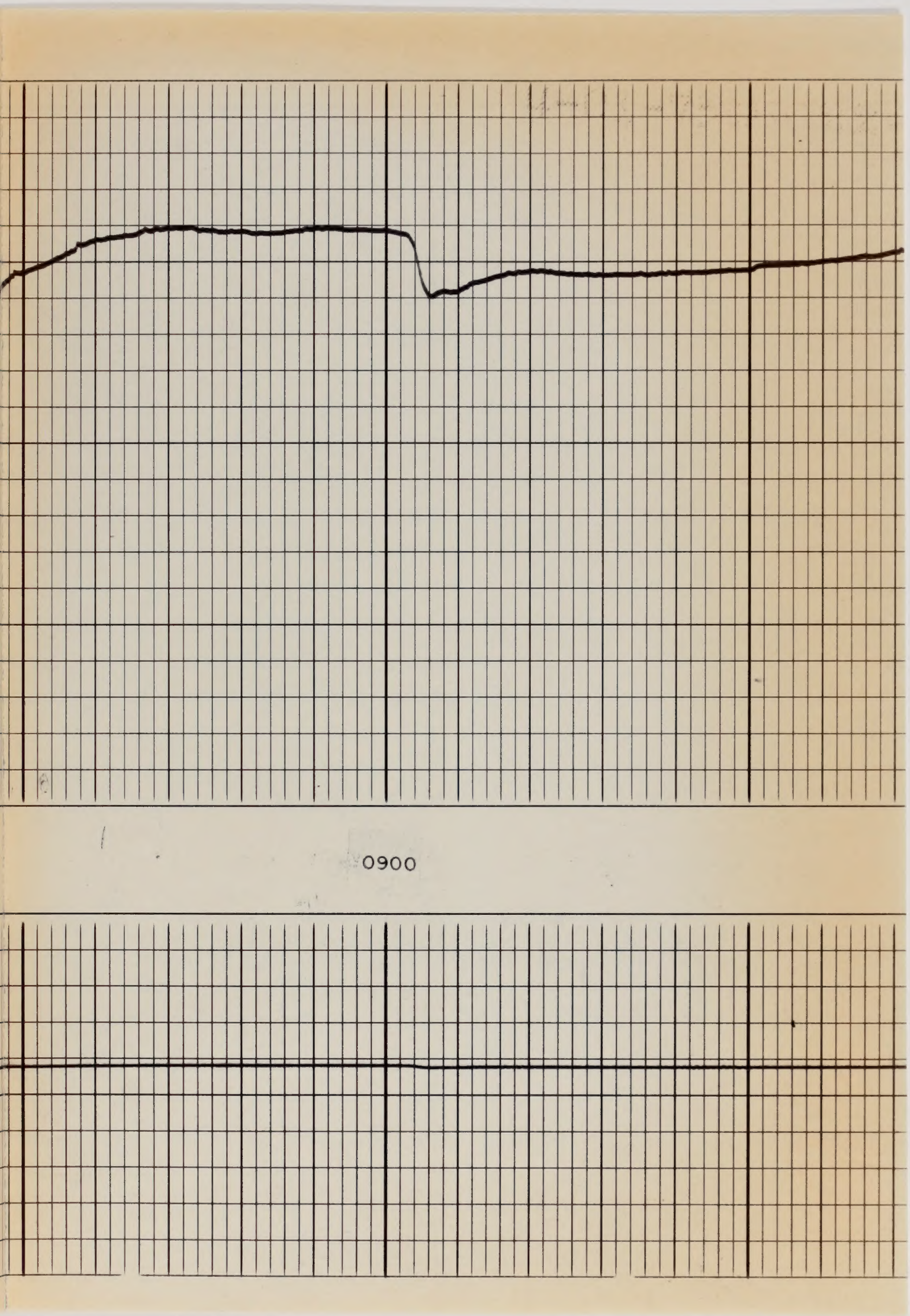

Elev:
VR
SCALE CHANGE
60
65
70
0700

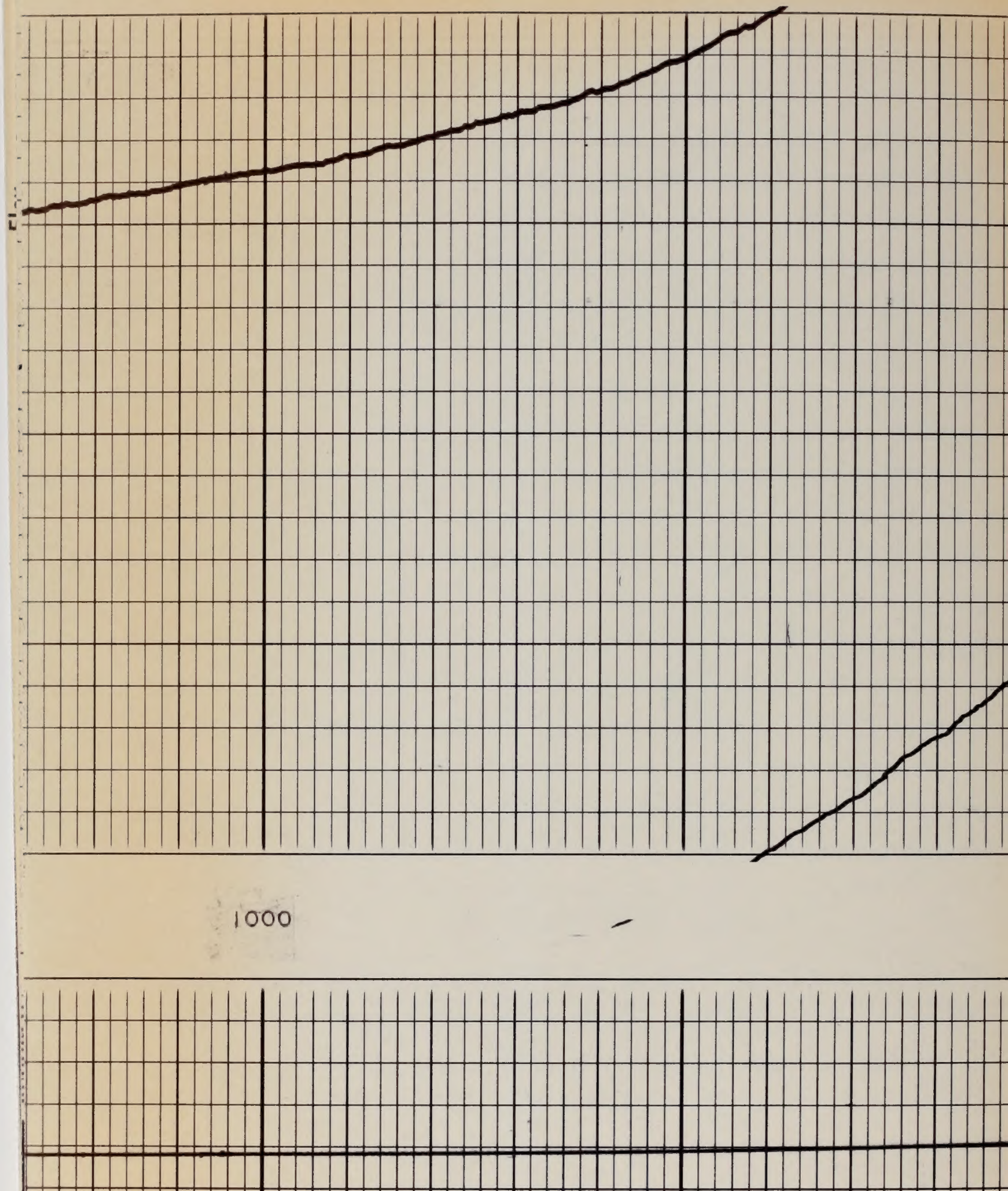

10800

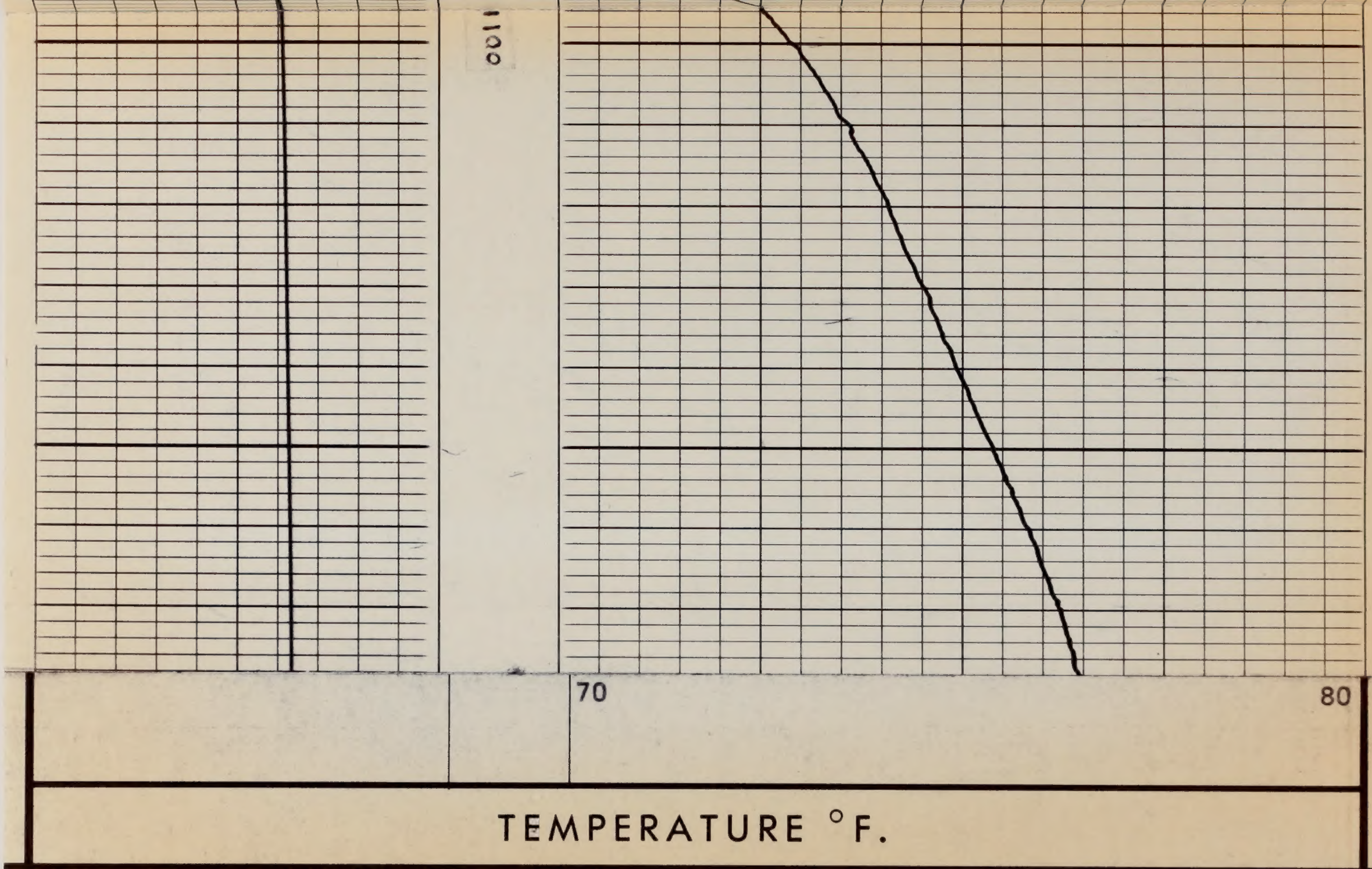

Elev:
0900
1000


SCALE CHANGE
70
75
80
-1100
REDUCED


REDUCED
TEMPERATURE
TEMPERATURE
0800
REPEAT SECTION


0900


1000



COMPANY ATLANTIC RICHFIELD COMPANY

WELL SORGHUM GULCH 1-A

SCHL. F. R. 1180
SCHL. T. D. 1180
DRLR. T. D. 1180

FIELD SORGHUM GULCH

COUNTY RIO BLANCO STATE COLORADO